M. E. LERNER
Editor

W. GLEED COE
Production Manager

R. E. GAINES
Circulation Manager

PETER P. PINTO
General Manager

THE RUBBER AGE

ESTABLISHED 1917

One of the World's Outstanding Rubber Journals

APRIL
1939

VOLUME 45
NUMBER 1

An Index to Vol. 44 of THE RUBBER AGE will be found facing page 56 of this issue.

INDEX TO CONTENTS

Pliolite: A Cyclized Rubber Derivative—*By H. R. Thies* 17
Aero AC 50 21
Thin-Walled Rubber Insulation—*By F. D. Benz* 22
Beacon Carnaqua Waxes 24
Moldable Shoe Insoles 24
The Cryo-Vac Process 25
Ruvis Elastic Thread 26
Aminox: General Purpose Antioxidant 26
Hewitt's 80th Anniversary 27
Permeability of Neoprene to Gases 28
Mareng Fuel Cell Tanks 28

REGULAR DEPARTMENTS

New Equipment Section 29
Book Reviews 30
Editorials 32
Late Domestic News 33
Financial News 40
Names in the News 38
Coming Events 36
Obituaries 42
Los Angeles News 38
Rubber, Cotton Markets 45
Chemical Markets 46
Statistics 47
Market Place 51
Classified Ads 56

Also Publishers of:

RUBBER RED BOOK
Directory of the Rubber Industry
Published Bi-Annually
Next Issue—May, 1939

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
First issue covers year 1935

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937.

Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York City

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $2.00 a year; Canada, $2.50; Foreign, $3.00. Single copies up to 3 months old, 25 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924. Contents Copyrighted 1939 by the Palmerton Publishing Company, Inc. Indexed in Industrial Arts Index. OFFICERS: P. L. Palmerton, President; E. D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer.

B·L·E

TIRES

TUBES

HOSE

B·L·E is the accepted standard of comparison for antioxidants.

B·L·E is recommended for use in the great majority of rubber products. Its superiority in imparting resistance to flex cracking, heat, and oxidation explains its wide popularity. Additional advantages perhaps not so widely recognized are:

Improved processing—smoother calendering and tubing at lower temperatures.

Perfect dispersion of antioxidant—greater uniformity.

Greater persistence—the effectiveness of **B·L·E** lasts longer.

Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER COMPANY

1790 BROADWAY NEW YORK, N. Y.

The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 45 April, 1939 No. 1

Pliolite

A Cyclized Rubber Derivative

By H. R. Thies

Goodyear Tire & Rubber Co.

FOR many years the attention of chemists has been drawn to the consideration of rubber as a raw material upon which to effect transformations into substances possessing the properties of resins. Nature provides the hydrocarbon (C_5H_8) in a variety of forms of which rubber is the most common. Balata and gutta purcha empirically the same as rubber closely resemble resins in being thermoplastic. In all these forms of the hydrocarbon (C_5H_8), the simple building unit nature has chosen is isoprene:

$$H_2C = \overset{\overset{CH_3}{|}}{C} - CH = CH_2$$

By some unknown process of nature hydrocarbons of high molecular weight are built from this unit. Such hydrocarbons, possessing relatively fewer double bonds, are therefore less unsaturated than in isoprene. In rubber there exists one double bond for each C_5H_8 group but up to the present time the number and the manner in which these groups are united are not precisely known. The most widely accepted chemical symbol for the rubber hydrocarbon, together with x-ray diffraction patterns of unstretched and stretched unvulcanized rubber, is shown in Fig. 1.

$$\text{Rubber} = \left(\begin{matrix} H & & CH_3 & & H \\ | & & | & & | \\ -C- & & C & = CH - & C- \\ | & & & & | \\ H & & & & H \end{matrix} \right)_x$$

The chemists who specialize on rubber work have not as yet decided whether this rubber molecule exists as a long chain or a large ring type structure *(1)*. Therefore, in discussing this structure we will endeavor to keep our chemical formulations expressed in the form of as few units of this C_5H_8 group as is possible for the sake of simplicity.

For those interested in the performance of the rubber molecule as such, the following tabulation gives the outstanding reactions of rubber other than its vulcanization with sulphur:

TABLE OF RUBBER REACTIONS

1. Rubber + hydrogen ⟶ C_5H_{10}.
2. Rubber + halogen ⟶ $C_5H_8Cl_2$ or $C_5H_4Cl_4$.
3. Rubber + hydrogen halides ⟶ C_5H_9Cl.
4. Rubber + organic halide ⟶ Thermoplastic amorphous solid.
5. Rubber + oxychlorides ⟶ $C_5H_8CrO_2Cl_2$.
6. Rubber + oxide of nitrogen ⟶ Rubber nitrosite compounds.
7. Rubber + organosulphonic acids ⟶ Thermoprene.
8. Rubber + stannic chloride or chlorostannic acid ⟶ Pliolite.

EDITOR'S NOTE: Considerable interest has been displayed in the rubber industry in recent months with regard to the cyclized rubber derivative developed by Goodyear and sold under the trade name of "Pliolite." In the near future we will publish a special article on "The Uses of Pliolite in Rubber Compounding." As a preliminary to this article, we are presenting herewith an abstract of a paper on "Pliolite—A Coating Material for Paper," given by the author at the annual meeting of the Technical Association of the Pulp and Paper Industry, February 20-23, 1939, at New York City. The abstract is devoted to the production of "Pliolite," rather than to its uses.

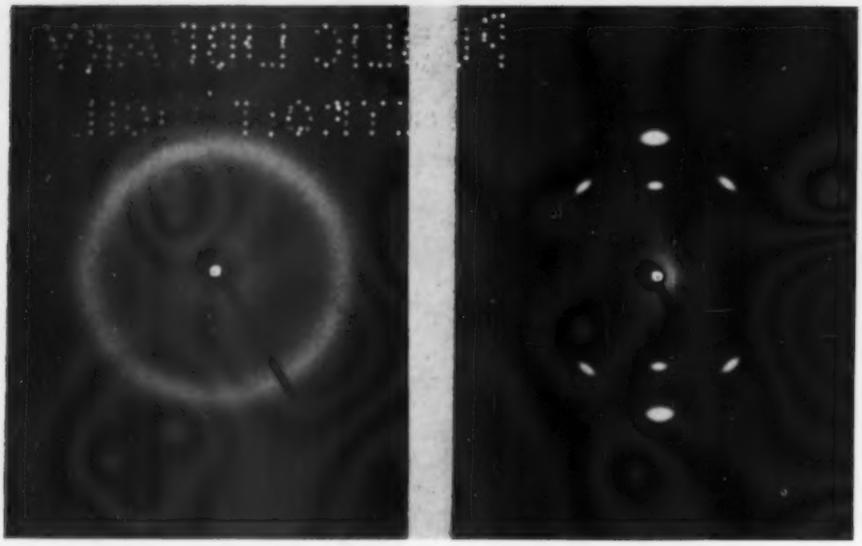
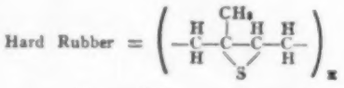


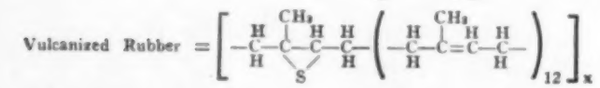
FIG. 1
Left: Unvulcanized Rubber (Unstretched).
Right: Raw Rubber (Stretched) 800% Elongation.

Perhaps the most interesting reactions for discussion would be those dealing with commercially exploited products. We show the chemist's concept together with x-ray pictures of the most widely known and most widely used rubber products (Fig. 2).

Hard Rubber =

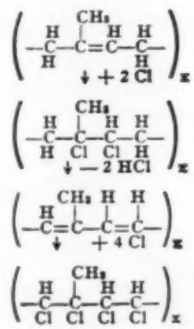


Vulcanized Rubber =



This first formulation is representative of ebonite or hard rubber and is one of the oldest known rubber compounds. The second formulation shown is given in order to contrast the formulae of the product combining 32 per cent sulphur with the rubber molecule to that combining 4-6 per cent. In this last formulation it is apparent that the double bond which is so reactive in the rubber molecule is not saturated in each isoprene unit and this is a conception which the writer has of how the molecules of rubber look as you see them evidenced in such things as inner tubes, tire treads, and the like.

Another quite widely used commercial product of rubber is rubber chloride *(2)*. The chemistry involving rubber chloride together with an x-ray photograph (Fig. 3), is given below:



that the conception put forth is that the rubber chloride molecule is a completely saturated molecule and that, in addition to having the double bond saturated with chlorine, substitution of two hydrogen atoms has taken place. It should also be mentioned

In examining this formulation it is well to note

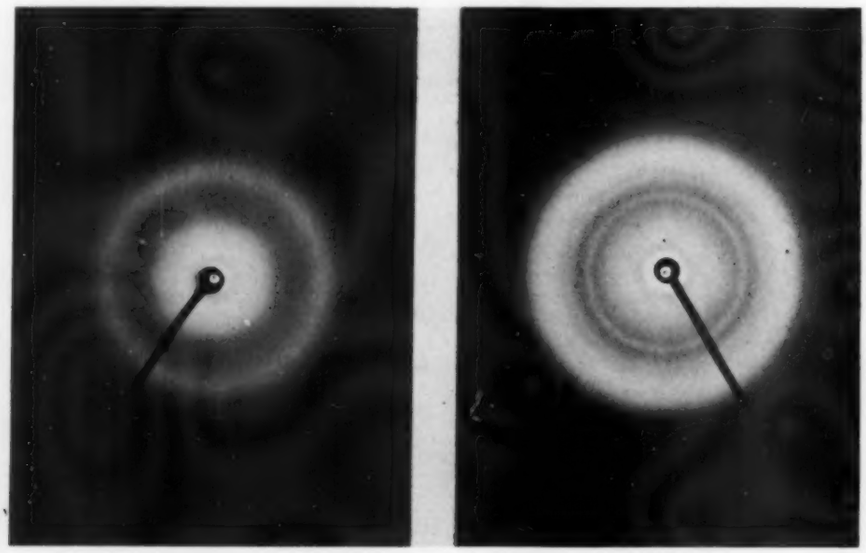


FIG. 2
Left: Ebonite.
Right: Vulcanized Rubber (Unstretched).

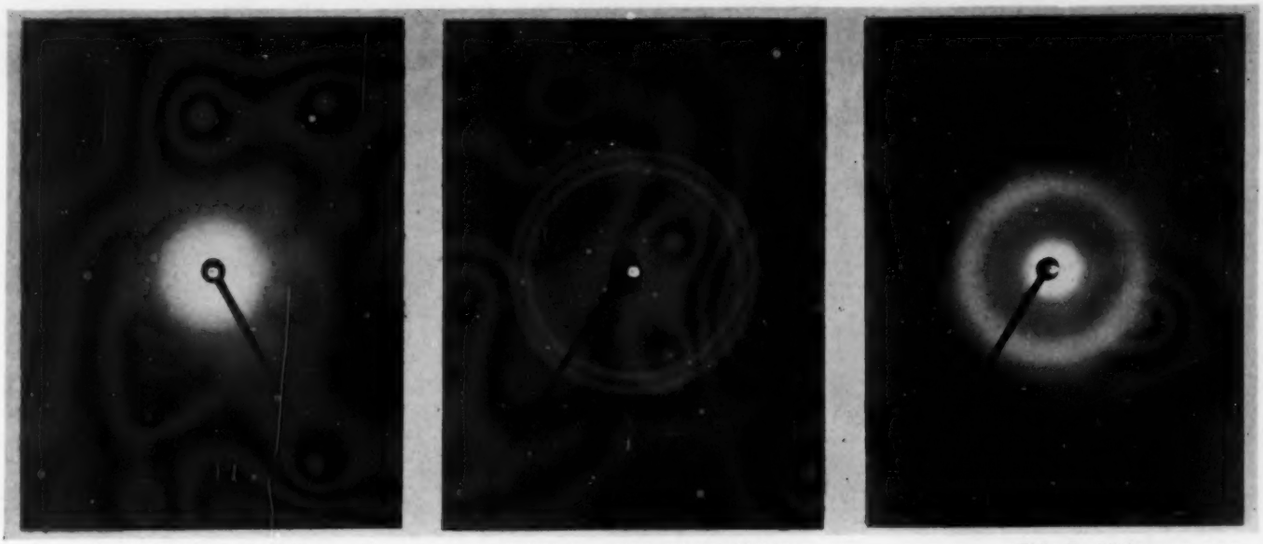


FIG. 3—Rubber Chloride. FIG. 4—Rubber Hydrochloride. FIG. 5—Pliolite.

that the actual analysis of chlorine present in rubber chloride is not as great as the theory calls for, due to the fact that crude rubber itself is composed of two materials. One form is called the sol form and the other form is known as the gel form *(3)*. Simply stated, this means that when crude rubber is extracted with a solution of petroleum ether or ethyl ether one obtains a very soluble fraction amounting to 75 or 80 per cent of the crude rubber. This material is the sol form and is more reactive insofar as saturation is concerned than is the gel form. It theoretically corresponds to the C_5H_8 grouping. The remaining fraction, which is unextractable and remains after treating with solvents such as mentioned, is known as the gel form. Chemically, its unsaturation is considerably less than that of the sol form. Therefore, in calculating theoretical saturation it is quite usually the case that the theoretical saturation will be somewhat higher than the actual saturation found. In the case of rubber chloride, for example, the figures show 68 per cent by theory; by actual practice this comes out approximately 63-65 per cent chlorine combined when the reaction is favorable.

Another very interesting product is rubber hydrochloride *(4)* (Fig. 4). This material, as can be seen,

$$\text{Pliofilm} = \left(\begin{array}{cccc} H & & CH_3 & \\ | & & | & \\ -C- & H & -C- & H \\ | & | & | & | \\ H & Cl & H & H \end{array} -C- \right)_x$$

is the rubber molecule wherein the double bonds have been saturated with hydrochloric acid. Physically, this product is quite dissimilar to the well-known rubber derivatives in that it gives a flexible, tough, transparent, water resistant and grease resistant film which is finding wide adaptation both as a fabric and as a packaging material under the name of Pliofilm.

If rubber is treated with such reagents as stannic chloride or chlorostannic acid, a product is formed which has the following structural formula *(5)* (Fig. 5):

$$\text{Pliolite} = \left(\begin{array}{ccccccccccc} & & CH_3 & & H & H & CH_3 & & & & \\ & H & | & H & | & | & | & H & H & & \\ -C- & | & -C- & | & -C- & | & -C= & | & -C- & & \\ & H & & | & H & H & & | & H & & \\ H & | & & | & H & H & & | & H & & \\ -C- & | & -C- & | & -C- & | & -C= & | & -C- & & \\ & H & | & H & H & H & | & H & H & & \\ & & CH_3 & & & & CH_3 & & & & \end{array} \right)_x$$

As can be seen this material is essentially different from rubber chloride or rubber hydrochloride type molecule in that it apparently has the ring structure formed between two molecules of the simple rubber hydrocarbon. This ring structure is then attached to two more molecules of the rubber hydrocarbon in which the double bond has not been saturated. Physically, this rubber derivative is a thermoplastic resinous type of material soluble in both aromatic and petroleum type hydrocarbons as well as chlorinated hydrocarbons and terpenes. If a comparison, however, is made with the raw rubber it is seen that solutions of Pliolite are entirely different in their behavior.

For a long time it has been thought that rubber and mixtures of rubber and paraffin had desirable waterproofing qualities which could be utilized to advantage on paper *(6)*. However, due to the fact that rubber, as such, is difficult to handle as a spreading medium and to the practical difficulty of getting it into non-tacky, thin films and obtaining transparency, it has only recently been widely used in the paper field. It has had extensive use in the waterproofing and coating of fabric. With the advent of Pliolite it is possible to utilize a derivative of rubber, which shows a decided improvement over rubber itself, in the waterproofing and moisture vaporproofing characteristics and yet does away with a number of disadvantages of rubber. Pliolite can be handled in various solvents in fairly high concentration and dries to a transparent, clear, glossy, non-tacky film, resistant to water and the passage of moisture vapor.

Manufacture of Pliolite

In manufacturing Pliolite, it has been found necessary to use, as a starting material, a very high grade of low protein content rubber. A number of sources were studied to determine the type which would yield a superior product and a low protein content rubber was selected as being the most desirable. This rubber is put into solution in a solvent and when this is accomplished the characteristic heavy, viscous, non-drying cement is made. This rubber cement is then placed in a jacketed reactor equipped with a reflux and is heated for a period of time with the catalyst. During this heating period an enormous reduction in the viscosity of the solution is experienced and a physical change is effected from the usual rubber into the resinous state *(7)*. It is, of course, evident

that the physical characteristics of the product can be altered depending upon the time which the above reaction is allowed to proceed. A family of resins is obtained, possessing distortion points varying from 25° to 105° C. These different types of Pliolite resin also yield different viscosities, when put into solution the resins which have the lower distortion point giving the higher solution viscosities.

The resin is recovered from the solvent as a finely divided powder. This powder is vacuum dried and is commercially known as Pliolite resin powder. This material, if used in solvents, appears to have the sol and gel phase of the parent rubber; therefore, for utilization in solvent it is necessary to mill this powder to yield Pliolite resin. This milling operation further reduces the solution viscosity. If films deposited from solutions are observed, they are found to be glossy, non-tacky, heat sealing and clearly transparent. It is evident, therefore, that when using Pliolite resin in solution the milled variety is desired.

Pliowax

If admixtures of Pliolite and wax are desired, where wax is to predominate, it has been found that the Pliolite resin-powder very readily dissolves in most of the common waxes by the process of heating the wax and adding the unmilled resin.

These mixtures are familiarly known to the trade as Pliowax. It has been found that the addition of Pliolite to waxes such as paraffin wax and ceresin materially increases the toughness of the wax, improves its gloss and to a very great degree materially strengthens the heat seal obtained when films of these mixtures are compared with films of the wax alone.

In mixtures of this type the addition of Pliolite resin unmilled to a 135° melting point paraffin will increase its melting point approximately three degrees for every 5 per cent of Pliolite added. The viscosity of the wax is also increased so that more wax can be held on smooth, slick surfaces when Pliolite is present than with the wax alone. A large amount of data has indicated better m.v.t.r. figures for Pliowax coated paper than for paper coated with wax alone, although it is granted that an integral coating of paraffin yields a moisture and vaporproof membrane *(8)*. We feel that the function of Pliolite in this particular instance is to strengthen the wax film so that it is not susceptible to cracking or breaking under small distortions when handled.

We have prepared a series of x-ray diffraction patterns of various Pliolite-wax mixtures running in range from 100 per cent Pliolite to 10 Pliolite-90 Paraffin. We have also taken x-ray diffraction patterns of a mixture of equal parts of Pliolite and paraffin at temperatures of 50° to 60° C. These pictures are given in Fig. 6.

From the above it is evident that at room temperature a true solution of paraffin in Pliolite occurs be-

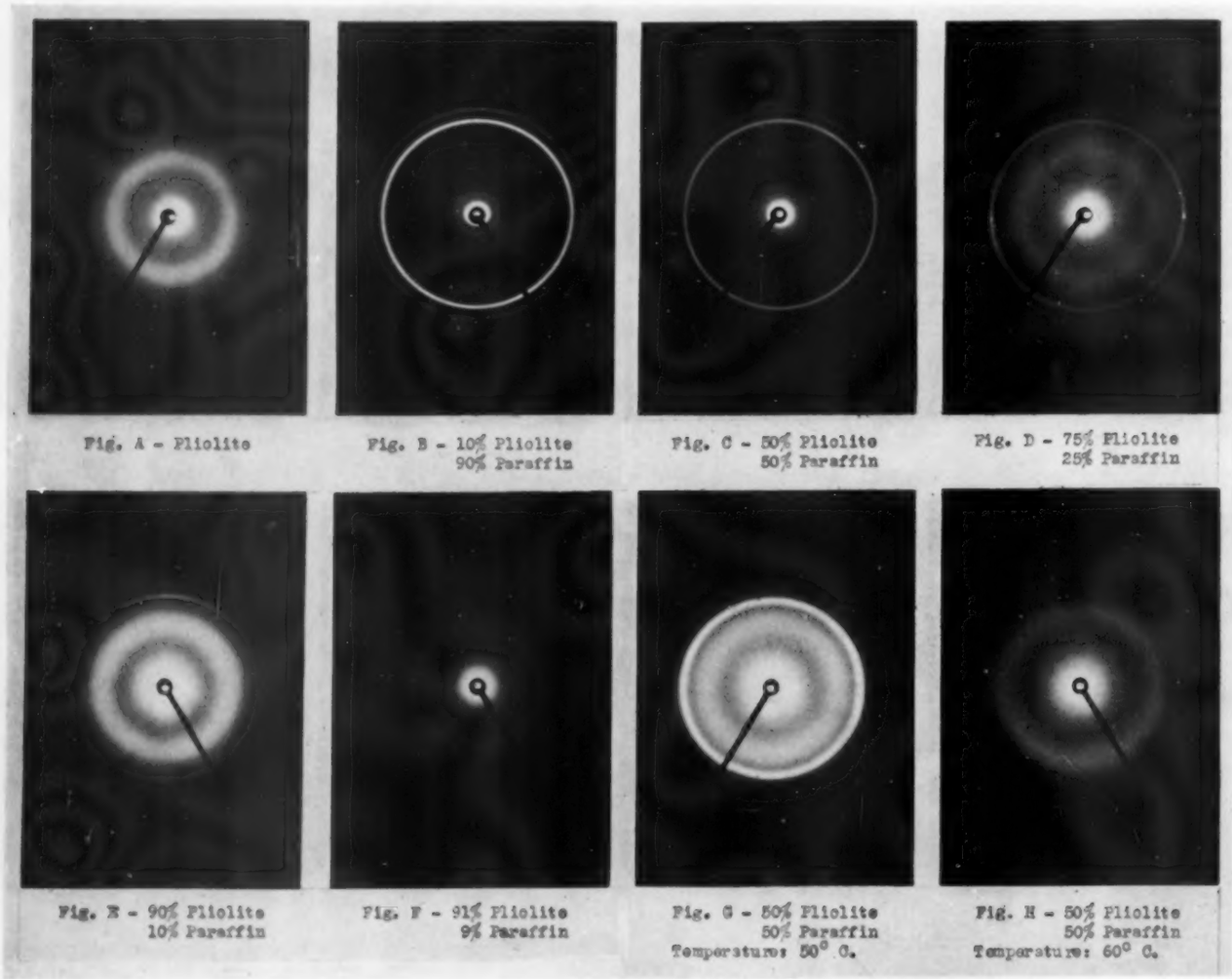


Fig. A - Pliolite
Fig. B - 10% Pliolite 90% Paraffin
Fig. C - 50% Pliolite 50% Paraffin
Fig. D - 75% Pliolite 25% Paraffin
Fig. E - 90% Pliolite 10% Paraffin
Fig. F - 91% Pliolite 9% Paraffin
Fig. G - 50% Pliolite 50% Paraffin Temperature: 50° C.
Fig. H - 50% Pliolite 50% Paraffin Temperature: 60° C.

FIG. 6

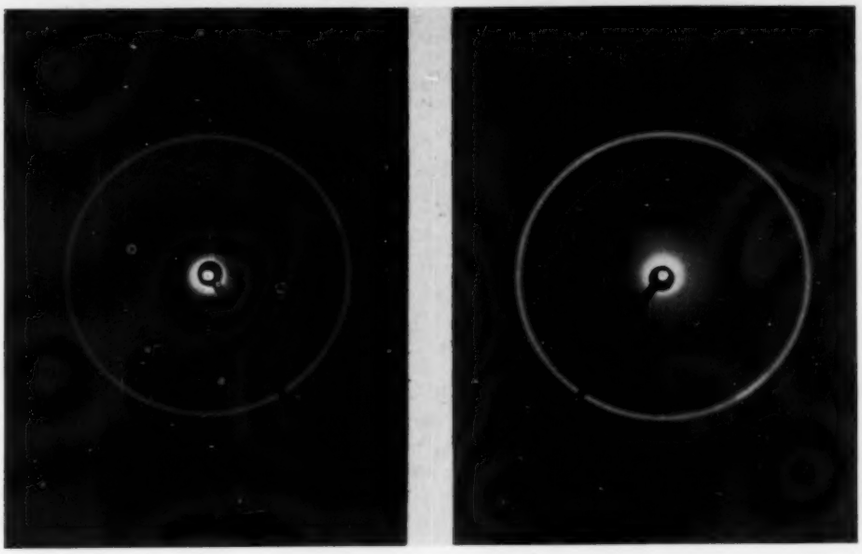


FIG. 7

Left: 100 Pliolite, 75 Wax, Unquenched, Dull.

Right: 100 Pliolite, 75 Wax, Quenched, Glossy.

tween 9 and 10 per cent. Figure E shows a trace of the paraffin ring while Figure F shows the paraffin ring to be absent and indicates that a true solution of the wax and Pliolite has been accomplished. It should also be noted that a film containing 90 Pliolite and 10 paraffin is optically clear even though the x-ray pattern does show the crystalline paraffin ring to be present. It has also been found that the solubility of wax in Pliolite increases with the temperature up to the melting point of the wax when they both become mutually soluble in all proportions. The x-ray diffraction patterns C, D and E show the gain in intensity of the Pliolite ring with respect to the paraffin pattern as the proportion of Pliolite is increased. The structure in each case is that of a homogeneous mixture, but not that of a true solution. Figures G and H illustrate the effect of a higher temperature on the structure of a 50 per cent composition. At the lower temperature, five degrees below the melting point of the wax, the paraffin rings are broadened and the less intense ones are not registered. At 60° C. a structure characteristic of a true solution is shown by the single broad halo.

It has also been observed in the practical applications of Pliowax films that in order to obtain a high degree of gloss it was necessary to rapidly quench the films just as in working with wax *(9)*. If this quenching operation was not done a dull film was obtained. The x-ray diffraction patterns (Fig. 7) show a dull and glossy Pliowax surface.

As can be seen, so far as the diffraction pattern is concerned there is no difference between these two types of films, the difference must therefore be in the orientation of the crystals.

LITERATURE CITED

(1) Wildchut, A. J., *Rubber Chem. & Tech.*, Vol. 7, p. 34 (1934).
(2) Clark, Geo. E., *Rubber Age (N. Y.)*, Vol. 38, p. 139 (1935).
(3) Smith, W. H., and Saylor, C. P., *J. Res. Nat. Bur. Stand.*, Vol. 13, p. 453 (1934).
(4) U. S. Pat. 1,989,362.
(5) Sebrell, Brunson and Calvert, *Ind. Eng. Chem.*, Vol. 19, p. 1033 (1927).
(6) Gwynn, U. S. Pat. 46,466 (Feb. 21, 1865).
(7) Endres, Thies and Clifford, U. S. Pat. 2,052,391; *Ind. Eng. Chem.*, Vol. 26, p. 123 (1934).
(8) Padgett, Fred W., *Oil Gas Journal* (Feb. 3, 1938).
(9) Abrams and Wagner, U. S. Patents 2,054,112; 2,054,-113; 2,054,114; 2,054,115.

All x-ray diffraction patterns by S. D. Gehman and J. E. Field, Research Department, Goodyear Tire & Rubber Co., Akron, Ohio.

Aero Ac 50

COMBINATIONS of accelerators are generally used, in more and more frequency, to obtain products with certain desired properties or to reduce costs. These combinations generally consist of mercaptobenzothiazole or one of its derivatives, and a guanidine derivative, or a small ratio of some other accelerator to give stocks with various curing rates yielding products with high modulus and tensile. Such combinations often have curing rates so rapid that vulcanization actually starts at the processing temperatures so that the stocks can only be handled in the factory by the addition of a retarding agent or by specially designed equipment.

In recognition of the demand for a delayed action activator, the American Cyanamid & Chemical Corporation has developed and introduced Aero Ac 50 for use with mercaptobenzothiazole or its derivatives. Aero Ac 50 is the reaction product of two mols. of diorthotolylguanidine and one mol. of zinc chloride produced in the form of an amorphous powder with a softening point range of 76 to 82° C. It may be used with D.P.G. or D.O.T.G. in the activation of the thiazole type of accelerator.

Laboratory tests led American Cyanamid to make the following claims for Aero Ac 50: It fluxes into rubber easily, thereby giving good dispersion and insuring a uniform cure, resulting in good resistance to flex-cracking; as an activator for the thiazole type of accelerators in the production of compounds with high modulus and tensile, it shows the desired delayed action necessary for good processing; as an activator for mercaptobenzothiazole in tire treads, it offers the possibility of improving or maintaining quality at lower costs.

Thin-Walled Rubber Insulation

Recent Developments Have Made It Possible to Design Cables Now with Much Thinner Walls of Insulation than Previously Required

By F. D. Benz

Wire Division, U. S. Rubber Co.

THE development of methods of purification of rubber and improvements in the methods of rubber compounding and application to wire within recent years have made possible the design of cables with much thinner walls of insulation for a given electrical requirement than is required when ordinary commercial rubber is used. These thinner walls of insulation have resulted in cables of smaller diameter, less weight, less initial cost, and lower installation cost.

The purification of rubber for insulating purposes is necessary because rubber as it occurs in nature has associated with it appreciable amounts of water soluble materials, particularly proteins, which detract from its insulating properties. This is well illustrated by Table I in which typical analyses of normal latex, a dry film obtained from it, and smoked sheet are given.

The resins and fatty acids associated with the rubber are not particularly harmful because they are relatively good insulating materials. The water soluble materials, on the other hand, are harmful, since they determine the extent to which rubber will absorb moisture or water with which it may come in contact. This is especially true of the nitrogen-containing materials, that is, the proteins, because they are so associated with the rubber that they form practically a continuous path through a rubber film through which water may be absorbed.

Since proteins contain approximately 16% of nitrogen, the protein content of the rubber given in Table I is approximately six times the figures given for nitrogen. That is, the protein content of dry rubber obtained from latex is about 4.2% and that of smoked sheet about 2.4%. The total water soluble material or material capable of absorbing water associated with rubber in latex is then about 10% of the weight of the rubber.

A film of rubber or other insulating material containing such a high percentage of water soluble materials will absorb relatively large amounts of moisture when in contact with water or a moist atmosphere. Since water is a conductor of electricity, such a material is practically worthless as an insulation under such conditions. To obtain superior insulating properties from rubber as it occurs in nature, it is therefore necessary to purify the material and then remove a large percentage of these harmful materials.

Smoked sheet is obtained from latex by coagulating the rubber with acid followed by washing, sheeting and drying the coagulum. A comparison of the figures given in columns three and four of Table I shows that some purification results from the process of forming smoked sheet, but this material still contains appreciable amounts of harmful ingredients. Purification of rubber in the form of smoked sheet involves the use of expensive equipment and treating

TABLE I.

	Latex		Smoked Sheet
	Wet Basis	*Dry Basis*	
Resins, etc.	2.0%	5.2%	3.3%
Nitrogen	.3	.7	.4
Ash	.4	1.0	.4
Water extract	2.1	5.5	2.1
Rubber	38.0	87.6	93.8
Water	57.0	—	—

agents and results in physical breakdown of the rubber itself. Purification of rubber in the form of latex, on the other hand, is a relatively inexpensive operation and does not physically harm the rubber. There are two principal methods used for purifying rubber in the form of latex, namely, centrifuging and creaming. Both of these are essentially washing operations in which the water soluble materials are removed by solution in water.

Creaming or centrifuging can be repeated as many times as desired on a given lot of latex, resulting in a rubber of increasing purity. In Laytex Wire (product of U. S. Rubber) triple creamed rubber is used. The extent to which this purifies the rubber, starting with normal latex, is shown in Table II. It is thus seen that the acetone extract, nitrogen and ash contents are reduced as the creaming operation is repeated. Triple creaming results in a reduction of the nitrogen content from .7% to .1%, and in the ash (salts) from 1.0% to .09%. It is evident that triple creaming gives a highly purified rubber.

For the purposes of comparison, the corresponding analyses of smoked sheet and deproteinized rubber are given in Table II. It will be noted that triple creamed rubber is far more pure than smoked sheet and compares favorably in purity with deproteinized rubber. Deproteinized rubber is acid coagulated triple creamed or triple centrifuged latex rubber and is the most highly purified type of rubber available commercially at present.

Moisture Absorption Properties

As indicated above, materials containing a high percentage of water solubles, such as normal latex rubber and smoked sheet, absorb relatively high percentages of water when in contact with water or a moist atmosphere, and are unsuitable for insulating purposes under these conditions. The extent to which normal latex rubber absorbs water after various periods of submersion is indicated in Table III, in which the figures represent milligrams of water absorbed per square inch of submerged surface. Table III also shows corresponding values for once, twice, triple and four times creamed latex rubber.

TABLE II.

Type of Latex or Rubber	*Acetone Extract (Resins)*	*Nitrogen (Proteins)*	*Ash (Salts)*
Normal Latex	5.20%	0.70%	1.00%
Once Purified	3.54	.33	.42
Twice Purified	2.83	.24	.15
Triple Purified	2.48	.10	.09
4 Times Purified	2.28	.08	.07
Deproteinized Rubber	2.20	.09	.08
Smoked Sheet	3.25	.40	.40

It is thus seen that four times creamed latex rubber absorbs only about one-tenth as much water under the same conditions as does rubber from normal latex. It is highly resistant to moisture and is therefore suitable for use as an insulation under extreme moisture conditions. It is of interest here to note that the reduction in the amount of moisture absorbed as a result of creaming corresponds closely with the reduction in the impurities as given in Table II.

Table III also gives the corresponding water absorption characteristics of pale crepe, smoked sheet and deproteinized rubber. This data shows that four times creamed rubber is superior in moisture absorption characteristics to both pale crepe and smoked sheet and, while not quite as good, compares favorably with deproteinized rubber.

Compounding

Having purified the rubber, either in the form of latex or as commercial deproteinized solid rubber, it is necessary to compound it with the required electrically high grade vulcanizing materials, antioxidants, etc., in such a manner as to not detract from its excellent electrical properties.

Developments in the manufacture of these compounding materials and their addition both to latex and to solid rubber have recently made this possible, and have resulted in rubber insulating compounds both in the form of latex and solid rubber which when applied to wire possess the following important characteristics: (1). High initial physical properties and good aging; (2). High dielectric strength and insulation resistance; (3). Low dielectric constant and power factor; and (4). High resistance to moisture.

Application to Wire

These high grade insulating compounds may be applied to wire either by the dip process for latex compounds or by the extrusion process for the ordinary rubber compounds.

(A). *The Dip Process:* The development of the dip process for the application of insulating compounds in the form of latex to wire has resulted in insulations of remarkable physical and electrical characteristics, centering and uniformity of wall thickness. In the dip process the wire is removed vertically from the surface of the latex compound. The excess liquid drains uniformly from the surface leaving a thin uniform layer of insulation surrounding the conductor. This is then dried as the wire travels vertically.

After drying, the wire is returned to the latex compound where a second layer is applied in the same manner. This alternate dipping and drying is continued until a layer of the desired thickness is produced. The insulation is thus applied in successive layers, and any defects which may develop are decreased or eliminated by the other layers at that point.

The dip process may employ either an unvulcanized or a vulcanized latex compound. When an unvulcanized compound is used, the insulation, after drying, is passed continuously through a suitable chamber where vulcanization is effected before the wire is taken up on a reel. It is thus not subjected to distorting forces prior to vulcanization and consequently contains no thin spots.

When vulcanized latex is used, the insulation is completely formed on drying, and is thus not deformed in any way prior to complete formation. Insulation applied by the dip process therefore contains no thin spots such as occur where the insulation is subjected to distortion prior to vulcanization as in the ordinary discontinuous tubing process.

In the dip process the rubber insulation is not worked mechanically in any way during compounding and is not subjected to strain during application to the wire. It therefore has the physical strength of the original unbroken down rubber, and is grainless. Insulation applied by the dip process thus has uniform high physical properties, is grainless, perfectly centered and contains no thin spots.

(B). *Extrusion Process:* The development of the continuous cure extrusion process has resulted in vast improvements in the quality of insulation applied by the tubing process, especially from the standpoint of uniformity of cure, centering and freedom from thin spots. In this process the uncured insulation is mechanically centered with respect to the conductor in the tubing machine head and then passes directly into a chamber where vulcanization occurs before the insulation is subjected to any distorting forces.

Insulation produced in this manner is thus well centered and free from thin spots. High grade electrical insulations applied in this manner give a far superior finished product than when applied by the conventional discontinuous tubing process.

Thin-Walled Rubber Insulated Cables

These improvements in the electrical properties of rubber insulation resulting from purification and the more uniform insulating walls resulting from improved methods of application to wire make possible the use of thinner walls of insulation for a given electrical requirement than are possible using conventional compounds and methods of application.

In brief, with such compounds and methods, it is possible to produce an insulation complying in general with a given set of electrical requirements with from one-third to one-half the insulation thickness required for conventional 30% compounds. This decrease in wall thickness results in cables of less diameter and weight and hence savings in initial cable costs due primarily to savings in sheaths and cable coverings.

These cables are covered by I.M.S.A. (International Municipal Signal Association) Specifications 16 and

TABLE III.

Type of Latex Film or Rubber	*Milligrams of Water Absorbed per Square Inch after Submersion for*			
	25 Hrs.	*50 Hrs.*	*75 Hrs.*	*100 Hrs.*
Normal Latex	12.1	13.0	13.3	13.5
Once Purified	4.8	6.2	7.6	8.9
Twice Purified	1.4	2.2	3.0	3.6
Triple Purified	0.9	1.4	1.6	1.8
Four Times Purified	0.6	0.9	1.1	1.2
Pale Crepe	1.4	1.9	2.2	2.5
Smoked Sheet	3.9	5.1	5.9	6.6
Deproteinized Rubber	0.5	0.6	0.6	0.6

TABLE IV.

COMPARISON OF THIN-WALLED AND REGULAR CABLES

Number of Conductors	9		24	
	Thin Walled	*IMSA*	*Thin Walled*	*IMSA*
Insulation Thickness (in.) ..	.015	.047	.015	.047
Lead Sheath Thickness (in.) ..	.047	.094	.078	.125
Outside Diameter (in.)	.59	.90	.86	1.27
Cable Diameter Saved (%) ..	35.0	—	32.0	—
Weight Lbs. per 1,000 Ft.	680	1375	1388	2900
Weight Saved (%)	50.0	—	52.0	—
Approximate First Cost Saved (%)	26.0	—	27.0	—

17-1937. Table IV shows a comparison of the dimensions and weights of typical thin-walled cables with those of cables complying with I.M.S.A. Specification 1-1937. The table also shows the percentage saving in diameter, weight and initial cost resulting from the purchase of thin walled cables. The results apply to 14 solid lead-covered cables, not paired.

The small diameters and light weights of thin-walled cables make them particularly suited for low voltage services such as used on fire alarm and police signal circuits. Small diameters are important since they permit installation of cables with a greater number of conductors in ducts of a given size. This makes possible expansion of service in growing areas without the enlargement of existing ducts.

The decreased weights make such cables easier to install than regular rubber cables. The superior resistance of thin-walled cables to moisture permits them to be terminated in ordinary terminal boxes without pot-heads. They are therefore less costly to install than paper cables which are frequently used for signalling purposes.

The ability of these thin walls to withstand the mechanical abuse to which they are subjected during installation and service has been questioned and this has been offered as an objection to their use. In this connection, it should be emphasized that these insulations have much higher tensile strength and elongation than regular 30% compounds and consequently have greater resistance to cutting, etc.

Thin-Walled Cables Are Lighter

Furthermore, the cables containing them are lighter in weight than regular cables. The weight of the finished cable determines to a large extent the abuse to which the insulation is subjected during installation. Because of their better physical properties and the lighter weight of the finished cable, these insulations will withstand the mechanical abuse to which they are subjected as well as or better than the thicker walls of standard 30% insulation.

In addition to being available with lead sheaths, thin-walled cables may also be obtained with a sheath consisting of a tape and weather-proofed braid or a 60% rubber jacket with or without a weather-proofed jute braid. The tape and weather-proofed braid cables are designed for use where the moisture conditions are not severe, and where maximum economy in initial cable cost is desired.

The 60% rubber sheath is designed for use where a moisture-proof sheath is required and where the vibration and corrosive conditions are too severe for lead. This sheath is compounded and cured to give a strong, tough abrasion and moisture resistant product of long life. The weather-proof jute braid is applied when the cable is exposed to sunlight and weather.

Methods of Splicing

Splices in cables of this type are unavoidable in most installations, and since the quality of the splice determines to a large extent the serviceability of a cable circuit it is important that the best possible splice be made at all times.

In general, these cables are spliced like ordinary rubber cables, and the methods used are well standardized, especially for braided and lead sheathed cables. The splicing of the 60% rubber sheath requires the use of special materials only recently available in commercial form. These consist of two 60% rubber tapes so compounded that, when applied in alternate layers, the combined mass will vulcanize after a period of time at ordinary temperatures to a product of high physical and abrasion resistant qualities.

Conclusion

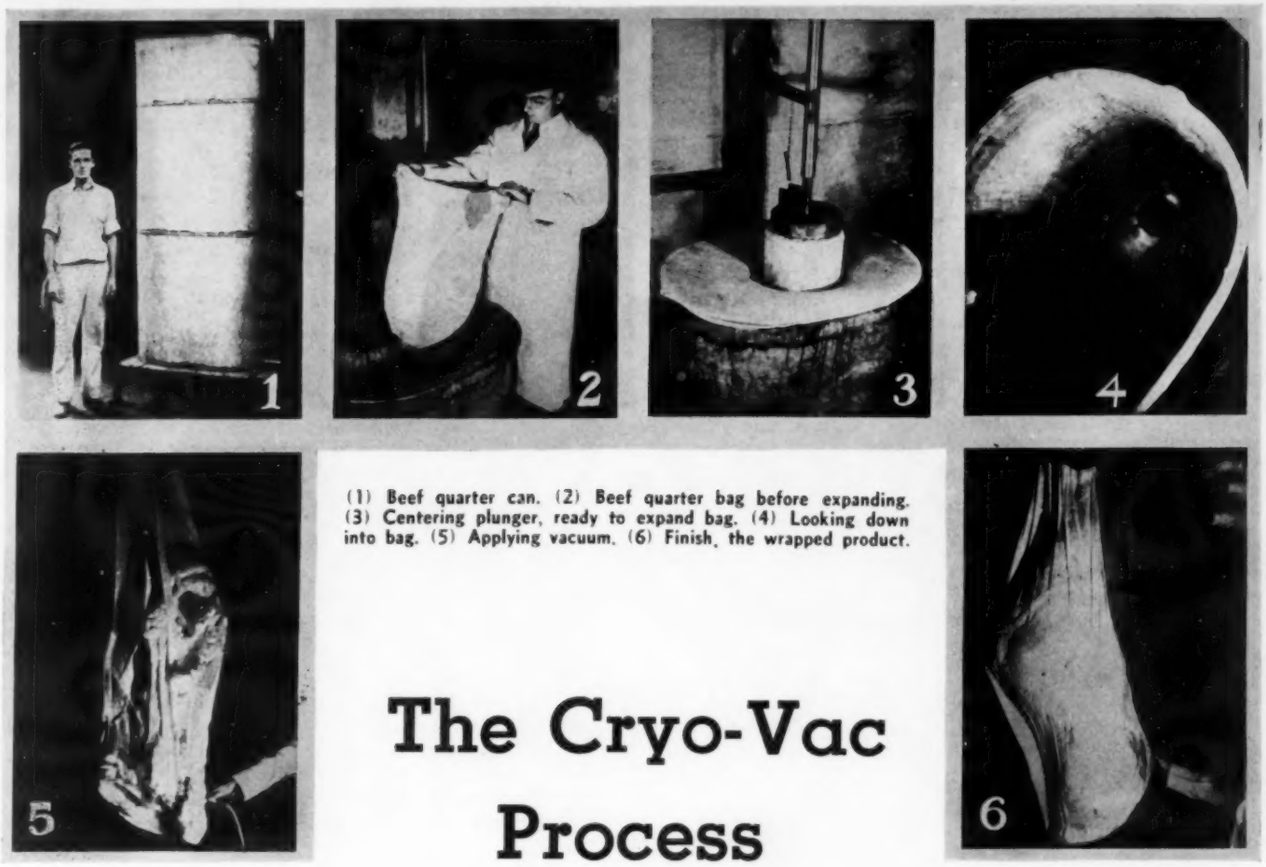
In conclusion, it has been shown that the development of methods of purification of rubber and improvements in the methods of rubber compounding and application to wire in recent years have made possible the design of cables with much thinner walls of insulation for a given electrical requirement than is required when ordinary commercial rubber is used. These thinner walls of insulation have resulted in cables of smaller diameter, less weight, less initial cost, and lower installation cost. Such cables are available in lead and non-metallic sheathed types. They are installed and spliced like ordinary rubber cables.

Beacon Carnaqua Waxes

TWO new synthetic waxes, having much the character of carnauba wax in addition to being self-emulsifying and giving films which are water insoluble, have been developed by the Beacon Company, 89 Bickford St., Boston, Mass. Called Carnaqua Waxes, the new products disperse in water to form water wax emulsions of extreme stability. According to the manufacturer, when a carnaqua wax emulsion is modified by one of the synthetic resin solutions, a material results which gives waterproof films. Not only are these films unaffected by water but are unaffected when subjected to abrasion under water. In addition, the films have a mellow gloss which is said to be higher than that of most waxes; are as durable as a synthetic resin varnish and as practical as a wax; and have a tendency to be self-levelling. Two grades are available, the difference between grades being in the color only and in the color of the finished emulsions.

Moldable Shoe Insoles

A PLASTIC compound, comprised of powdered cork and latex, for use on the underside of insoles before they are cemented in shoes, has been developed by the Daniels Shoe Products, 67 Riverdale Avenue, Port Chester, N. Y. Shoes equipped with this new compound, called "Mo-Lo", mold themselves to the wearer's feet, according to the manufacturer. In addition, Mo-Lo supports the areas that need protection and relieves pressure, as well as leveling up the metatarsals, thus distributing the weight over the stronger area of the feet. Several shoe manufacturers have already been licensed under the Daniels patent. A line of Mo-Lo arches and foot appliances incorporating the new plastic material has also been developed.



(1) Beef quarter can. (2) Beef quarter bag before expanding. (3) Centering plunger, ready to expand bag. (4) Looking down into bag. (5) Applying vacuum. (6) Finish, the wrapped product.

The Cryo-Vac Process

Dewey and Almy Develops Method of Wrapping Chickens, Sides of Beef, and Other Meatstuffs, in Latex Wraps

TAKING advantage of the technique developed in the manufacture of its latex meteorological balloons, the Dewey and Almy Chemical Company, Cambridge, Mass., has entered the food wrapping field. The Cryo-Vac method, as it has been termed, permits the wrapping of chickens, sides of beef, and other meatstuffs in rubber, and offers advantages to meat packers said to never have been possible heretofore. The definition of Cryo-Vac can be construed to mean "cold and empty," an apt definition as the method of handling will indicate.

Cryo-Vac wraps are made of specially compounded latex, are odorless, impart no taste, and are moisture and vapor proof. Formulae and production technique developed in the manufacture of latex meteorological balloons were called into use to give the wraps the necessary low cost, strength, pliability, etc. No sulfur was used in the compounding process.

In its original form, the Cryo-Vac wrap resembles a deflated, wide-mouthed toy balloon. In use, it is blown up by stretching the wide mouth over a frame or can, and a vacuum is drawn around the outside. Thus, the wrap takes the shape of the cylindrical container into which it has been drawn, while the chilled sides of the container "freeze" it into expanded size. Into this expanded, open-end "package" a chicken (or other meatstuff) is lowered, following which a vacuum hose removes the inside air and draws the wrap close to the solid. The neck of the wrap is then twisted and clamped to make the whole vacuum pack thoroughly air-tight and vapor-proof.

The final operation calls for immersing the completed package in warm water, the effect of which is to "thaw" the "frozen" rubber so that the wrap attempts to shrink to its original size and thus forms a taut, transparent wrap around the chicken. This whole process is for quick-frozen foods and is not designed for covering unfrozen or ordinary foods. For wrapping larger objects, such as a side of beef, the process is varied slightly, but the same fundamentals remain. Special equipment was of course designed to reduce the handling time in packaging to a point well below that for many other competitive wraps.

The major advantage of Cryo-Vac lies in the protection afforded to foodstuffs, particularly in the elimination of air and the complete moisture tightness secured. For instance, pork products do not develop rancidity in the fat, while chickens show no "freezer burn," the bane of low-temperature preservation of poultry. Prevention of moisture loss not only preserves the original weight, but reduces frosting of cooling coils in the refrigerating units and increases their freezing efficiency as well. This unique protection also permits the use of any type of freezing method—air blast, spray, immersion, or contact.

Cryo-Vac wraps for poultry are designed as one-trip containers to be removed by the consumer. Larger bags are intended for the storage of seasonal surpluses of green hams, pork loins, etc., which are temporarily frozen and released on the market as needed. For the latter purpose, the latex bags can be washed, shrunk and re-used several times, an important economy

measure. The largest bags (or wraps) are being designed for use with quarters of beef, veal and lamb carcasses, and will find their principal market in the export field. It is said that a wrap for a 350-pound side of beef is a practical possibility.

An absorbing story of research lies behind the development of Cryo-Vac. As a first step, Dewey and Almy constructed a special freezer laboratory, entirely devoted to freezing and storage rooms. These rooms are kept at constant temperatures. The laboratory is equipped with a bacteriological section, a + 35° F. chill room, a + 5° F. room, a — 5° F. room, and a — 15° F. room. In addition, there is a brine spray booth, capable of giving rapid freezing at temperatures down to —20° F., a brine dip tank, and an air blast circulating device, so that any type of freezing can be duplicated.

The laboratory is equipped with a Micromax multiple thermometer. There is also a 10-ton Carbondale refrigerator and freezing unit to supply the refrigeration. The Micromax measures and records temperatures at twelve different stations every twelve minutes, giving a continuous record. The thermocouples can be located in any place desired, either in the rooms or in the meat itself, and plugged into the Micromax for recording purposes. This method permits the taking of simultaneous readings at several different depths in a piece of meat while it is being frozen in order to get freezing curves. An experienced meat cutter is employed at the laboratory so that any work with particular cuts will be handled in the same manner they would be in the meat industry.

Equipment Subjected to Tests

The equipment for applying the latex wraps is first constructed in experimental form and then tried out in the chill room, since the temperature in that room is the same as that used in the industry proper. When the development has progressed far enough, it is then made up as a practical working unit and brought into the chill room again for further extended tests and practice runs.

The new wrap is still in the introductory and experimental stage, with several interesting possibilities under consideration. In one test, carbon dioxide replaced the air in the bag to determine the benefits claimed for storage in that gas without the usual special storage equipment and resultant cost. In other experiments, the wraps are used to protect the meats during freezing by spray, air blast or immersion. Sides of beef hung in these wraps are said to show reduced loss from mould, without restraining the enzyme action that produces prime beef. The wrapping of fish, too, has been given consideration with excellent results predicted.

The development and application of the Cryo-Vac process by Dewey and Almy was a "natural" for three major reasons: (1) The company has an extensive knowledge of the handling and preserving of foodstuffs; (2) it fits in with the production technique developed in connection with the latex meteorological balloons previously referred to; and (3) the company has a world-wide sales organization which covers the large meat-exporting countries of South America, Australia and New Zealand, where the need for the protection offered by the latex wraps is instantly obvious.

Closing date for advertising copy for the 1939 RUBBER RED BOOK has been advanced to April 29. If you have not yet contracted for space, do it now.

Ruvis Elastic Thread

A NEW type of elastic thread, called Ruvis, spun from a blending of viscose and latex, has been developed by Celloprene, Ltd., Blackfriars House, Manchester, England. The new thread, which can be supplied in hank, on double-ended bobbins, and in other forms familiar to textile use, such as cones, pirns and beams, is said to open up a fresh field for new types of fabric, and to give added scope for original textile designs. In the process of manufacture, the elasticity of the new thread can be controlled to meet the requirements of the elastic to be produced, whether the tissue is to have a one-way or a two-way stretch.

Some of the Claimed Advantages

The advantages claimed for Ruvis thread over ordinary cut threads include a greater resistance to deterioration due to exposure or washing, the possibility of obtaining a longer length without knots, and the advantage of being able to make a satisfactory thread in a fine count. The life of fabrics made with the new thread is said to be at least six times that of fabrics produced with cut rubber thread. According to tests conducted by the Research Association of British Rubber Manufacturers, Ruvis thread has a high degree of recovery from prolonged elongation.

According to its manufacturer, the new thread will withstand washing (with any kind of soap) and the usual processes of laundering and ironing or dry cleaning. Samples have been immersed in boiling water for five minutes and then dried at a gentle heat in an air stream 100 times successively and the yarns were not affected in any way. Fabrics, such as bathing suits, incorporating Ruvis thread, are said to resist the effects of repeated immersion in sea water just as satisfactorily as a woolen fabric.

Aminox—General Purpose Antioxidant

A NEW general purpose antioxidant for use in rubber, called Aminox, has been introduced by the Naugatuck Chemical Division of the United States Rubber Co. It is offered as the newest product in the ketone diarylamine class of antioxidants (of which B-L-E is a member), and is specifically recommended for use in products which are subjected to the combined effects of heat and oxidation. It is also said to be valuable for protecting against the effects of continued mechanical flexing.

Aminox, unlike B-L-E, is a dry powder, and will be preferred in many cases for convenience in handling. It is light tan in color and has a specific gravity of 1.14. It is completely soluble in rubber and no tendency to bloom from either vulcanized or unvulcanized stocks has been noted. It softens between 80 and 90° C., or sufficiently below the usual factory mixing temperatures to assure good and uniform dispersion throughout the rubber, according to Naugatuck Chemical.

The new antioxidant is non-volatile at the normal temperatures encountered in processing, vulcanizing and service of rubber products. It has only a very slight pigmenting action in rubber either before or after vulcanization. In stocks exposed to light, it causes only a mild darkening. However, its antioxidant strength is such that amounts as small as 0.25 to 0.35% on the rubber are often found more protective and less discoloring in light colored stocks than larger amounts (1%) of so-called non-discoloring antioxidants.

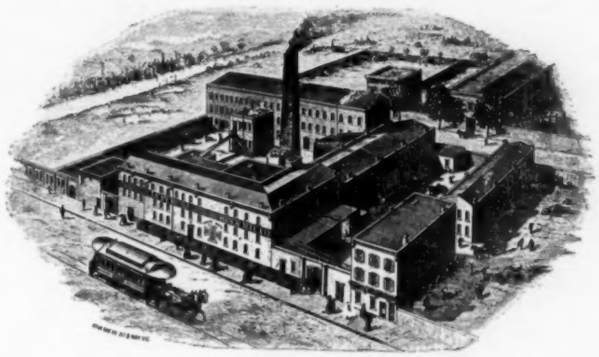
Hewitt's 80th Anniversary

Gutta Percha & Rubber Manufacturing Company, Parent Concern of Present Hewitt Organization, Started Operations in 1859

IN 1859 the Gutta Percha and Rubber Manufacturing Company embarked on the manufacture of gutta-percha and rubber products. Many years later this firm was absorbed by the present Hewitt Rubber Corporation of Buffalo, N. Y. This year, therefore, marks the 80th anniversary of the founding of the Hewitt parent concern and that of several products made by the original company which are still being produced in the Buffalo plant. The birth and growth of the company should prove of interest.

In the 50's of the last century gutta-percha ornaments became very popular in this country. An enterprising firm of New York manufacturing jewelers, Warren and Spadone, sensing the possibilities of crude rubber and anxious to meet the demand, began in a small way the production of these gutta-percha ornaments. Their business in this new department grew so rapidly that the making of jewelry, their original line of business, was discontinued entirely and the growth of the new industry carried on vigorously. From the start the Gutta Percha Company manufactured fire hose which has come through the years to be favorably known in all parts of the world. Its Maltese Cross brand is standard equipment in many municipal fire departments.

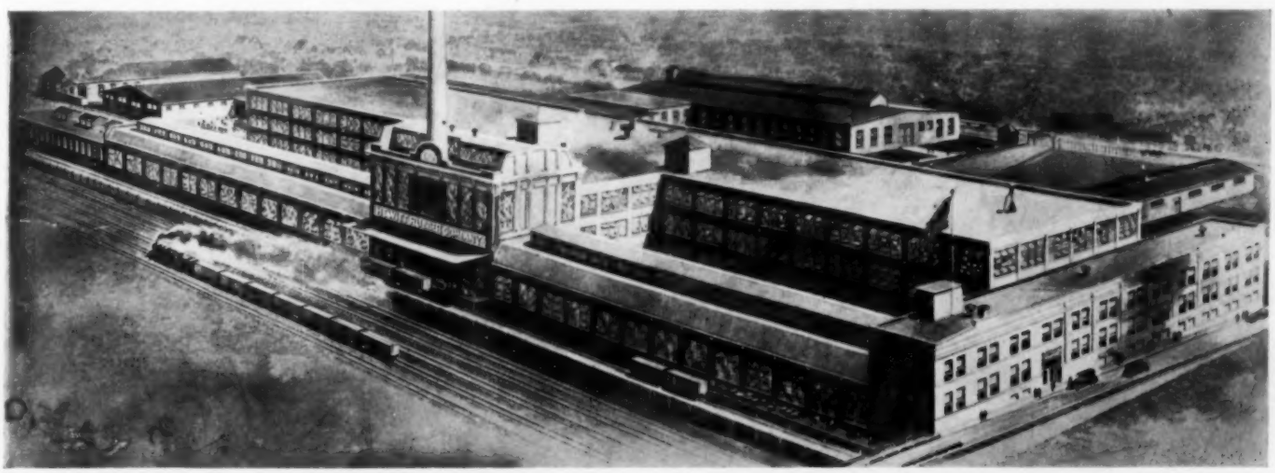
In 1904 Herbert H. Hewitt founded the Hewitt Rubber Company. The firm's original intention was to confine itself to the manufacture and sale of products then coming into wide use in the railroad field. But as years passed and rubber found new uses in all fields of industry, the manufacturing lines of Hewitt became more diversified. In 1926, Hewitt acquired the business of the Gutta Percha and Rubber Manufacturing Company. During the following year the name of the company was changed to Hewitt-Gutta Percha Rubber Corporation, under which name operations continued until 1933 when the name was shortened to Hewitt Rubber Corporation.



Original plant of the Gutta Percha & Rubber Mfg. Co.

Hewitt's principal products are industrial hose, conveyor, bucket elevator and power transmission belting. Other products include molded and sheet rubber items. These products are sold to over one hundred separate industries throughout the United States, Canada, Mexico, and overseas. In the United States alone some two hundred distributors sell Hewitt products. Assisting them are thirty-three factory representatives located in strategic points throughout the country.

Outstanding in the success of the Hewitt Rubber Corporation are the activities of the Hewitt research laboratory, which, under the direction of Michael Berman, has contributed many improvements to the rubber manufacturing industry of this country. The many recent Hewitt developments include advantageous uses for synthetic rubber compounds, principally neoprene. Twelve types of industrial hose with neoprene as the principal compounding ingredient have been developed by Hewitt. Another outstanding success on the part of Mr. Berman and his associates, including William Brockner, Production Superintendent, was



The modern Hewitt plant, consisting of seven buildings containing 205,000 square feet of manufacturing space, located in Buffalo, New York.

the invention and perfecting for commercial use of "Twinweld" hose for oxy-acetylene welding. This hose consists of two lines of high quality cord-reinforced welding hose molded side by side into a single unit.

The Hewitt plant consists of seven buildings containing 205,000 square feet of manufacturing floor space, making it one of the largest plants on the Niagara Frontier. Approximately 500 men and women are employed regularly. Introduction of new products enabled Hewitt to maintain comparatively high production through the business recessions of the past ten years. Three products in particular, Twinweld Welding Hose, Synthetic Rubber Gasoline Pump Hose, and Synthetic Rubber-lined Petroleum Dock and Cargo Hose, have each netted large sales volumes and have carried the Hewitt name and service to new parts of the world.

The following comprise the Hewitt management, each officer having been with Hewitt ten years or more: Thomas Robins, Jr., President; Earle K. Twombly, Vice-President and Treasurer; F. G. Cooban, Vice President; F. E. Miller, Vice President; W. S. Carleton, Vice President, in charge of Eastern Division; L. D. Bigelow, Vice President, in charge of Western Division; and J. H. Hayden, Secretary.

Permeability of Neoprene to Gases

BECAUSE of its high degree of elastic extensibility, rubber has long been employed as the gas-retaining film in the construction of a wide variety of inflated objects. However, its comparatively high permeability limits its usefulness for many purposes, particularly in gas-containing structures in lighter-than-air craft. Neoprene is one of a group of modern synthetic integuments which is characterized by rubber-like elasticity. It differs from rubber in its superior resistance to swelling in oils and gasoline. A less generally known quality is its lower rate of permeation by gases.

In view of the possible extensive use of this material in the construction of aeronautical fabrics, an investigation of its permeability was conducted at the National Bureau of Standards, Washington, D. C., for the Bureau of Aeronautics of the United States Navy Department. The facts obtained are presented in a paper by T. P. Sager and M. Sucher in the January, 1939, issue of the *Journal of Research*.

The permeability of neoprene at 25° C. (77° F.) is shown to be about one-fifth to one-sixth that of rubber for films of equal thickness, and about one-third to one-fourth for those of equal weight, the difference being due to the higher specific gravity of neoprene as compared with rubber. The relative permeabilities of helium and carbon dioxide to that of hydrogen as unity are approximately the same as those of rubber. The increase in permeability with temperature is shown to be exponential.

The presence of cloth in neoprene-coated fabrics was found to contribute to the impedance to gases to the same extent as with rubberized fabrics. The presence of moderate amounts of the usual compounding ingredients does not appreciably affect the rate of permeation. Although no advantage was gained from including paraffin wax in the coating composition, its employment as a supplementary coating on the fabric was shown to lower the permeability decidedly. Coatings spread with cements containing highly volatile solvents tend to have pinholes. Toluol, or its equivalent, appears to be the most satisfactory solvent.

Mareng Fuel Cell Tanks

LEAKAGE of metal gasoline tanks due to the continuous vibration to which they are subjected has long been a problem to the aircraft designer. The problem was heightened by the fact that light metals had to be used in the construction of these tanks. In airplane construction each ounce of weight is subject to rigid censorship. The problem of leakage, however, is believed to have been solved for all time by the development of the "Mareng Fuel Cell" by the Glenn L. Martin Company of Baltimore, Maryland.

The Mareng Fuel Cell is made of light-weight fabric coated with neoprene, DuPont's chloroprene rubber. Gasoline in these fabric cells does not touch metal since it is in contact only with the neoprene coating. Neoprene, unlike rubber, is unaffected by gasoline and oils. The structure of the wings, fuselage or float of an airplane afford compartments in which the fabric cells are installed. Instead of fitting these compartments exactly, the cells are designed in every case to be slightly larger in each dimension than the walls and undersurfaces against which they are to rest. Because of this over-sizing factor, the impregnated fabric is never subject to stretching or twisting but serves solely as a static, vibration-proof container, all strains and stresses being taken by the surrounding structure of the wing, fuselage or float. The new construction also eliminates the danger of corrosion.

Another advantage of the neoprene-coated fabric cells is the rapidity and ease of repair work. Although pierced in several places, through both fabric and surrounding structure, a few minutes of "vulcanizing" effort, and the cell is as good as new. It has also been demonstrated that even when the cell is pierced in flight, the resultant leakage of gasoline is definitely retarded. Piercing of the treated fabric leaves a slit rather than a hole, and under the internal pressure of the gasoline, the fabric "snaps back" into place and tends to close the slit against rapid leakage. E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, has been licensed to extend the market for the new fabric fuel cells into all fields of industry.

EDITOR'S NOTE: Due to lack of space Chapter XV of P. W. Barker's "Biography of Charles Goodyear" does not appear in this issue. It will be published in the May number. This biography, which has been running serially since April, 1938, will be concluded in the June, 1939, issue.

New Equipment

Improved Wiegand Rubber Pendulum

SEVERAL years ago a heat engine with rubber as the working substance was invented by W. B. Wiegand, now technical director of the Columbian Carbon Company. Called the Rubber Pendulum, this

instrument was described in *Transactions of the Institute of the Rubber Industry* (Vol. 1, p. 141, 1925). Some improvements in the design of the original pendulum and a detailed consideration of the theory appeared more recently in the same journal (Vol. 8, p. 151, 1935). Still more recently, however, Lawrence A. Wood and Norman Bekkedahl of the National Bureau of Standards built an improved pendulum, described in the February, 1939, issue of the *Review of Scientific Instruments*. The major features of the latest model are said to be an improvement in mechanical stability, a decrease in size and weight, and considerable simplification of parts.

The apparatus consists of a vertically mounted brass rod which is pivoted at its central point where a small right-angle piece of metal oscillates on knife edges. The top of the rod holds brass weights while the bottom end is attached to common rubber bands under tension. The action of the weights is to overturn the pendulum but this action is counterbalanced by the pull of the rubber bands. As compared with the previous pendulum, the present model has the shield mounted in front of the rubber bands inverted, and the stretched rubber bands exert their restoring force as a downward rather than an upward pull on the moving element. Because of this change the rubber bands no longer tend to lift the knife edges out of their supports and there is no necessity for weights at the lower end of the brass rod. Furthermore, since one rubber band is placed in front of the rod and one behind it, their pulls are symmetrical, so that equal loads are supported by the two knife-edges.

With ordinary rubber bands, operation of the new pendulum is possible at elongations of less than 90%, although higher elongations give better performance. Under the conditions of Wiegand's experiments he found operation impossible below a critical elongation slightly less than 300%. It has also been found possible, as Wiegand discovered, to operate with the pendulum bottom-heavy, by lowering the weights so that in the absence of the heater the pendulum would come to rest in the center of its swing in a vertical position, rather than in a position inclined to the vertical. The pendulum, of course, is kept in continuous operation by heat energy emitted by a radiant heater placed near the rubber bands, this energy being intermittently absorbed by the rubber bands.

Taylor 10BG Hygrometer

PRESENTING for the first time a wet-and-dry bulb instrument that combines high accuracy and legibility with complete accessibility for installation and routine servicing, the No. 10BG Hygrometer has been introduced by the Taylor Instrument Companies, Rochester, N. Y. The new instrument is said to be especially adapted for air ducts and rubber drying rooms or any other closed compartments where humidity plays an important role. To increase the efficiency of the new hygrometer, the wet and dry bulbs have been staggered and consequently can be used in either horizontal or vertical ducts without being on the same plane. This assures proper circulation of air across both bulbs under all conditions. The flat tube scales of the instrument are mounted horizontally, thus presenting a more natural position for reading the mercury column and increasing the angle of vision. There are no separate scales to slip, corrode or tarnish. To give permanent ease of reading the etched numerals are filled with black pigment and covered with an orange-yellow lacquer for the maximum in legibility and contrast. Rubber grommets insulate the thermometer stems and bulbs from all metal parts, eliminating bulb conduction error and reducing the chance of breakage from mechanical shock. In operation, water is supplied the wick by filling the water bottle and inverting it in the bottle holder, which is designed to take the regular "stubby" beer-bottle. All parts having contact with the water are treated for corrosion resistance. The thermometers are interchangeable and easily replaced, the

only tool necessary being a screw driver. Where a pressure or a vacuum of more than ½-inch of water makes a bottle-fed hygrometer impractical, Taylor has designed a hygrometer with constant level reservoir. This tap-fed reservoir is adapted for use on any hygrometer, is easy to mount, easy to clean, and is composed entirely of corrosion resistant materials. The space required for installation is only 4 x 8 inches. The height of water in both the float and wick chambers is adjustable.

Vernier-Set Timers

ESPECIALLY well adapted to automatic machinery, to molding and extrusion presses, to the purging of gas-fired ovens, and to the timing of furnace operations, a new series of Vernier-Set Timers has been

developed by the Automatic Temperature Control Co., Inc., 34 East Logan St., Philadelphia, Penna. The new timers, known as Series 2800, are said to combine flexibility, accuracy and ruggedness with low price. By employing the Vernier principle, the time cycle can be set accurately to within a split scale division, according to the manufacturer. The desired adjustment is maintained with no locking device required. Special features, such as independently wired loads, higher voltage operation, or contact modifications, are available within the 2800 series. All types are equipped with Telechron motors. One type (2803) permits four arrangements of load circuits. The desired load circuit condition is easily secured, while load circuit changes are readily made without tools and without dismounting the timer.

Roller-Type Jar Mill

SPECIFICALLY developed in cooperation with one of the large rubber companies, a new, all-purpose roller-type jar mill has been introduced by the United States Stoneware Co., 60 East 42nd Street, New York City. The new mill, which requires no clamping into frames or housings, may be used for the grinding of pigments, carbon black, colors, and other materials. The revolving rollers of the mill are of rubber-covered steel and are mounted in brass-bushed bearings. Standard sizes are arranged to accommodate up to four "Loxeal" jars, either of the 1, 1½ or 2-gallon sizes. These jars are made of chemical stoneware, tapered

at one end to a 4¼-inch opening. The lids are gasketed and held in place by means of a patented clamp. The motors are of the continuous-duty, geared-head type, the 1 and 2-jar machines being supplied with ¼ h.p. The outside dimensions of the 1-jar size are 13 inches wide by 25 inches long.

Book Reviews

Commodity Year Book—1939. Compiled and Published by the Commodity Research Bureau, Inc., New York City. 8½ x 11 in. 624 pp. $7.50, plus postage.

(Available from *Book Department,* THE RUBBER AGE)

Although there are numerous publications devoted to one or two types or groups of commodities, there was no single source of statistical information on all commodities until the publication of this volume. Designed to fill a definite need for a comprehensive and up-to-date reference work on commodities, the book contains important fact-finding studies, statistical data and price records in chart and tabular form on more than 50 leading commodities, including grains, textiles, tropical products, industrial products, fats and oils, livestock and metals. A brief history of each commodity is given. In the section devoted to rubber, as an example, the current restriction scheme is fully explained and a chronology of events transpiring during 1938 which affected the rubber market is given. Rubber statistics supplied, in chart and tabular form, include world shipments of plantation and wild rubber, world shipments of crude rubber, price trend in the past eighty years, reclaimed rubber data, consumption of crude rubber in principal countries, and world stocks of crude rubber in and out of regulated areas. In addition to specific data on various commodities, the book includes a number of special studies covering topics which affect commodity prices. It is planned to publish the book annually.

•

The Rubber Index—1939. (Part I—Chemicals, Compounding Ingredients, Etc.). Published by *The Rubber Age (of London),* 88/90 Chancery Lane, London, W.C. 2, England. 10 x 8 in. 64 pp. 5s (approximately $1.25).

This is the first volume in a series which together will comprise a Directory of the Rubber Industry and Allied Trades of the United Kingdom. This volume covers chemicals and compounding ingredients, and includes an alphabetical list of suppliers, a group chart indicating which companies supply certain types of materials, itemized charts of specific compounding ingredients, a section devoted to miscellaneous materials and their suppliers, an index to brand names divided into accelerators and miscellaneous materials, and a subject index. Each section is readily reached by means of colored tabs. It is presumed that other volumes of the "Index" will be devoted to rubber manufacturers in England, rubber machinery and equipment, fabrics and textiles, etc.

•

Proceedings of the Forty-First Annual Meeting. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Penna. 6 x 9 in. In Two Parts. Part I—1402 pp. Part II—674 pp. $5.50 each in paper cover, $6.00 in cloth, and $7.00 in half-leather.

Part I of the latest *Proceedings* includes reports of 50 committees outlining important standardization and research work, as well as giving data on 162 specifications and tests prepared or revised for the first time in 1938. The report of Committee D-11 on Rubber Products is included in this volume. Part II contains 45 technical papers in addition to the Edgar Marburg Lecture on "The Torsion Test." Discussions held on each paper at and subsequent to the meeting are included. Ten of the papers comprise the Symposium on Impact Testing.

•

The Knack of Selling Yourself. By James T. Mangan. Published by The Dartnell Corporation, Ravenswood and Leland Avenues, Chicago, Ill. 5½ x 8½ in. 256 pp. $2.50.

This book differs from most of those devoted to problems of sales and salesmanship in that it does not stop at whys or wherefores but tells the reader how and when. It includes an extensive set of exercises, practices, routines, practical hints, helps and suggestions—all couched in terms of simplicity. The author expresses derisiveness at the "merit" system of advancement, and includes a number of anecdotes to prove his point. All salesmen will find this book of interest.

Physical Constants of Hydrocarbons. Vol. 1. Paraffins, Olefins, Acetylenes, and Other Aliphatic Hydrocarbons. By Gustav Egloff. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York City. 6 x 9 in. 403 pp. $9.00. (A.C.S. Monograph No. 78).

This is the first of four volumes to be published on the melting point, boiling point, specific gravity and refractive index of all classes of pure hydrocarbons. The study is restricted to these four physical constants chiefly because they are frequently employed in the identification of hydrocarbons and in industrial engineering. The first three volumes of the series will be devoted exclusively to a critical study of the four physical constants of the hydrocarbons, while the fourth will discuss their interrelationships. As indicated by the subtitle, this first volume is devoted to the paraffins, olefins, acetylenes, and other aliphatic hydrocarbons. Vol. II will include the cycloparaffins, cycloolefins, cycloacetylenes, etc., while Vol. III will present the aromatic series and more complex condensed ring systems of which the carcinogenic hydrocarbons are representative. The data is presented in table form throughout the book, with bibliographical references given for each class of hydrocarbons. It represents a study started sixteen years ago, and should prove of special interest to rubber physicists and chemists.

•

Practical Replanting of Rubber. By E. W. Whitelaw. Published by The Times of Ceylon Co., Ltd., Colombo, India. 6 x 9½ in. 106 pp. Rs 7-50 (approximately $2.65).

Since the question of new planting versus replanting is currently occupying the attention of rubber producers, especially those in countries which are signatories to the restriction agreement, this book comes at an opportune time. The author vigorously defends replanting methods and covers the entire subject from discussing the necessity for replanting to detailing proven methods. There are 25 excellent illustrations in the book, many of which are instructive to the planter, as well as a complete subject index. The book is highly recommended to all those interested in rubber cultivation.

Booklets, Catalogs, etc.

Selected Information on Manufacturers of Tires and Other Rubber Products. Securities and Exchange Commission, Washington, D. C. 8¼ x 10¾ in. 64 pp.

This report, one of a series which attempt to bridge the gap between data available in the files of the Securities and Exchange Commission and the many potential users to whom the data is now relatively inaccessible, contains a summary of selected data on 18 manufacturers of tires and other rubber products registered under the Securities Exchange Act of 1934. It provides individual data for each of the companies as well as combined data for all companies in the group. Included in the data on individual companies are a general survey, names of parent and subsidiary firms, outstanding security issues of each company, salary data, profit and loss statements, and surplus reconciliations. Companies covered are Baldwin, Brown, Dayton, Faultless, Firestone, General, Goodrich, Goodyear, Hewitt, Kleinert, Lee, Lima Cord, Norwalk, Pharis, Samson, Seiberling, and U. S. Rubber. Both the Samson Corporation and the Samson Tire & Rubber Corporation are included.

•

Conveyors Handbook. (Catalog HB-39). Mathews Conveyor Co., Ellwood City, Penna. 4¾ x 6½ in. 384 pp. (Offered without cost to engineers and key men in factories only.)

This pocket-size handbook contains valuable data on various types of conveyors including roller, wheel, belt, live roller and spring mounted types. Data on vertical elevating conveyors, vertical hoists, and inclined pusher-bar conveyors is also given. In addition to specifications and recommendations for use, the handbook contains a number of interesting photographs depicting the various types of conveyors under service conditions.

Aerosol OT in Pigment Slurries. American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City. 8½ x 11 in. 8 pp.

Water suspensions of pigments, such as clay or whiting, which are used to cool compounded stock during various stages of rubber processing, do not always thoroughly wet the rubber, thus resulting in non-uniform coatings. According to this booklet, the addition of a small quantity of Aerosol OT to the pigment suspensions or slurries not only decreases the tendency of the pigment to settle out but also more thoroughly wets the surface of the rubber so that the rubber receives a more uniform coating. Photographs of pigment slurries incorporating Aerosol OT indicating these factors are reproduced in the booklet, as well as photographs of rubber stock taken after dipping in various slurries and drying which show the effect of small quantities of the wetting agent discussed.

•

Petroleum Products for Rubber. Engineering Division, Standard Oil Company of New Jersey, 26 Broadway, New York City. 8½ x 11 in. 8 pp.

This bulletin presents some of the fundamentals of rubber compounding and then presents a graphic picture of the use of a few of the company's petroleum products in the industry. Data is presented on such solvents as Mentor 28 and 30, the Forum and Zerice Oils, and the Coblax Oils. Information on Standard Oil's paraffin and petrolatum is also given. In addition to a description of the various solvents featured, data on Dipex M, the company's mold lubricant, is included in the bulletin.

•

Packaging Catalog—1939. Published by Breskin & Charlton Publishing Corp., 122 East 42nd St., New York City. 8½ x 11½ in. 562 pp. $2.50.

The latest edition of this catalog, which has become the source book of information for the entire packaging industry, covers virtually every phase of the industry, with particular emphasis on developments during 1938. It includes articles by leading designers and manufacturers of packages and packaging materials, and is amply illustrated. Of special interest, is a directory and buyers' guide. In all, there are 108 chapters, divided into 14 main sections with handy thumb tabs for reference.

•

The Story of the Tire. (10th Edition). Goodyear Tire & Rubber Co., Akron, Ohio. 7 x 10 in. 64 pp.

This latest edition of Goodyear's "Story of the Tire" commemorates the one hundredth anniversary of the discovery of vulcanization by Charles Goodyear, and includes a brief biography of the inventor. Like previous editions, it traces the development of the crude rubber industry, the production of tire fabric, the manufacture of tires and tubes, and describes various miscellaneous products made by the company, including Pliofilm and Airfoam. Brief biographies of leading Goodyear executives are also given.

•

A Better Tire Cord. Bibb Manufacturing Co., Macon, Georgia. 8½ x 11 in. 16 pp.

This booklet first lists eleven factors which should be found in "the best tire for any job," and then sets out to prove that Bibb Heat Resistant Cord contributes more to these factors than do either rayon or ordinary cotton cords. Clever illustrations are used throughout the booklet to indicate the claimed advantages of the Bibb product. Pieces of H-R Cord and rayon cord are supplied with the booklet to enable the reader to make some suggested simple tests.

•

Let's Stick to the American Way. By W. O'Neil. General Tire & Rubber Co., Akron, Ohio. 3¾ x 8¾ in. 16 pp.

This booklet contains observations on present-day conditions in most of the principal countries of Europe as compared to the American way of living, made by Mr. O'Neil, president of General Tire, upon his return from a recent business tour of Europe. A number of editorial comments made by various newspapers and magazines on Mr. O'Neil's observations are also included in the booklet.

Editorial Comment

Cotton for Rubber

THE suggestion advanced by Paul W. Litchfield, president of Goodyear, at the annual stockholders' meeting of that company last month, to the effect that the United States trade its surplus cotton for an emergency reserve of crude rubber, merited the attention of the authorities at Washington. More than that, it got it. A few days ago Senator Byrnes of South Carolina revealed that a barter program between this country, England, Holland and Belgium for the exchange of approximately 2,000,000 bales of American cotton and a large quantity of American wheat for rubber and tin is being given earnest consideration.

According to Senator Byrnes, the program sought would propose that the four governments involved agree to exchange commodities at a stipulated price purely for stock purposes. This stock would be held off the market for a period of at least five years unless prices rise above an agreed upon level at which time the commodities might be released. The necessity for this provision, especially where rubber is concerned, should be immediately evident. Rubber prices, despite the attempts of the International Rubber Regulation Committee, too often tend to get out of hand. Few commodities are so sensitive to economic conditions and rumors as is rubber.

The reason for the barter proposal lies in the fact that the American Government has purchased or has accepted as collateral on loans more than 11,000,000 bales of cotton. Unless some action is taken to substantially reduce this surplus, cotton prices, already too low for profitable production, will continue to be depressed. On the other hand, Congress is definitely considering the accumulation of an emergency supply of crude rubber. This all-important material is one of ten "strategic" materials for which the United States is almost entirely dependent on foreign sources, England and Holland alone controlling more than 90% of the world's production. Therefore, why not trade cotton for rubber, alleviating the cotton situation in this country and profiting the English and Dutch rubber cultivators!

Mr. Litchfield has carefully thought out a method under which the barter program of cotton for rubber would not upset either market from the price angle. Moreover, he proposes that the Government's reserve of crude rubber be exchanged at stated intervals for the newly-purchased rubber of American manufacturers so that there would be no possibility of deterioration of stock. From the rubber industry's point of view the barter plan as proposed would be extremely helpful in regulating the price of crude rubber to some extent since an emergency reserve which could be released if the market price went too high would be an excellent brake on the price situation.

•

Excellent Meeting

THE smooth fashion in which the technical sessions and the banquet of the Baltimore meeting of the Rubber Division, A.C.S., were conducted is a source of gratification to the members who attended. The officers and the members of the Entertainment Committee are to be congratulated on the completeness of their plans and on their efficient handling of the multitudinous details which go to make a successful meeting.

Not only were the physical arrangements excellent (the room, projecting and amplifying systems, etc.) but the conduct and attention of the members themselves were tributes to the masterful handling of the meetings by Chairman George K. Hinshaw. On every side it was said that the Baltimore meeting was one of the best ever held by the Rubber Division.

Another feature which produced much favorable comment was the substitution of a nationally-known speaker at the banquet, in this instance General Hugh S. Johnson, in place of the former night-club type of shows. Chairman Verne L. Smithers, and the other members of the Entertainment Committee, are to be complimented on this step, and it is to be hoped that this attempt to inject a serious note into the Division's banquets will be but a forerunner to other similar events at future meetings.

CURRENT • NEWS of the Rubber Industry

APRIL, 1939

Committee D-11 on Rubber Products Holds Annual Meeting in Columbus

Reports Embracing Recommendations for New and Revised Standards Made by Subcommittees; Technical Committee on Automotive Rubber Is Organized to Work with S.A.E.

AMONG the important actions taken by Committee D-11 on Rubber Products of the American Society for Testing Materials at a meeting held in Columbus, Ohio, during A.S.T.M. Committee Week, March 6 to 10, was the decision to organize a new Technical Committee on Automotive Rubber. It is anticipated that the work of this new group will include development of standards for rubber used in motor mountings and similar automotive applications, in addition to other rubber products such as V-belts and various types of hose. The Committee will have the cooperation of the Society of Automotive Engineers in this work. As yet, no appointments on the Committee have been made.

Committee D-11 has completed a survey of the classes of packings and of specifications for these materials in current use, including rubber sheet packings (both cloth-inserted and all-rubber) and asbestos sheet packing. This information is being compiled for use in the standardization of test methods for these products. The Subcommittee on Tape gave consideration to possible revision of the present cold adhesion requirements for existing A.S.T.M. friction tape to establish separation limits of 8 ± 4 inches per minute instead of the present maximum of 15 inches per minute. The reason for this proposal is to endeavor to make A.S.T.M. tape acceptable for railway signal work as well as for general electrical purposes.

Preparation Methods Approved

The tentative methods of sample preparation for physical testing of rubber products (D-15) were approved for adoption as standard. The tentative method of tension testing of vulcanized rubber (D-412) is to be revised and continued as tentative. One change will make the A.C.S. and Federal Specification Board micrometer used for thickness measurements the A.S.T.M. standard in place of the present one. The new micrometer will employ 3 ounces dead weight load on a ¼ inch foot in place of the present 9 ounce load. Other changes will take into account the grain effect in rubber specimens and will permit the use of compensating head testing machines for all tension machines.

The Subcommittee on Physical Testing of Rubber Products has prepared a questionnaire which will be circulated in the immediate future covering all details of tension tests. From this it is expected to determine whether further changes are necessary and particularly to aim at a standard practice for elimination of imperfect specimens or questionable results and for a statistical treatment of data obtained.

Two cooperative laboratory checks for determining small amounts of copper and manganese in rubber have been completed. Discrepancies between laboratories using the same methods have been found to be very considerable in the case of both manganese and copper, indicating that the methods in their present form are not satisfactory. The subcommittee in charge is continuing its work in an effort to develop a suitable analytical procedure for determining these elements. The committee has also decided to undertake a study looking toward a general revision of the methods of chemical analysis of rubber.

The Committee also approved the addition of a footnote in the test for abrasion resistance (D-394) calling attention to the availability of A.S.T.M. standard specimens for abrasion tests from the V. L. Smithers Laboratories. The Subcommittee on Life Tests has completed a thorough study of the air pressure heat test and has concluded that the present A.S.T.M. procedure is satisfactory as published, with reference to reasonable reproducibility in various laboratories. A section of this subcommittee was authorized for the development of a standard aging test procedure using artificial light.

The group working on rubber products for absorbing vibration appointed a section to investigate further the method for determining compression set. It also presented an alternate method for hardness of rubber using a Pusey and Jones Plastometer as a new tentative method. The Subcommittee on Dynamic Fatigue Testing considered test methods for compression flexing using three instruments: the Goodrich Flexometer, the Firestone Compressatometer, and the St. Joseph Lead Co. flexing machine. Because of the importance of this type of test in evaluating rubber for heat resistance in flexing and resistance to deterioration caused by compression hysteresis it was decided to incorporate the procedures mentioned in a new test.

A study of viscosity determination by several methods has been completed by the Subcommittee on Tests of Liquid Rubber Products and it expects to recommend shortly a tentative method for determining viscosity of cements. The Subcommittee on Sponge Rubber has completed a questionnaire with which to survey methods in current use for determining the physical properties of sponge rubber. The existing chemical methods of the A.S.T.M. are considered satisfactory for this product.

Hard Rubber Tests Completed

The Subcommittee on Hard Rubber has completed proposed methods for physical tests, chemical analyses, and electrical tests of this material and will recommend these to the Society for publication as tentative. The tentative methods of test for adhesion of vulcanized rubber (friction test) (D-413) and adhesion to metal (D-429) are being recommended for adoption as standard.

In the three specifications D-27, D-353, and D-469, covering various types of insulated wire and cable, the voltage limits for shielding will be lowered in accordance with industrial practice. Wall thickness on No. 8 A.w.g. wire is to be changed from 4/64 inch to 3/64 inch, but this is provisional on similar simultaneous action in Underwriters Laboratory Specifications and the National Code. Also in D-27 (Class AO, 30 per cent, Hevea Rubber Compound) changes will be made in requirements for saturants and finishes to incorporate the Underwriters Laboratories specifications for interior finishes.

The committee accepted a specification for insulating compound for a tough rubber jacket for electric cords and cables to be issued as tentative this year with the understanding that additional requirements may be developed later and agreed to by the test section for inclusion in the specifications.

SYMPOSIUM FEATURES MEETING OF RUBBER DIVISION AT BALTIMORE

More than 300 members and guests attended the meeting of the Rubber Division, A. C. S., held in Baltimore, Maryland, on April 4 and 5 in conjunction with the 97th meeting of the Society. The sessions and banquet of the Rubber Division were held at the Hotel Emerson but technical meetings of all other divisions of the Society were held at the Fifth Regiment Armory.

The technical meetings of the Rubber Division were held in four sessions, on Tuesday and Wednesday, April 4 and 5, followed by a report of the Crude Rubber Committee and a short business session. The banquet was held in the Ballroom of the Hotel Emerson on the evening of April 4. The technical program consisted of 22 papers, of which 12 constituted a Symposium on Synthetic Rubber and Elastic Polymers. (Abstracts of all these papers, with one exception, were published in the March, 1939, issue of THE RUBBER AGE).

Best Meeting in Years

The meeting was one of the most interesting held by the Division in years. Not only were the facilities of the meeting room good, but Chairman George K. Hinshaw (of Goodyear) proved to be a master at getting both high attendance and rapt attention. The calibre of the papers was distinctly of a high order, but much still remains to be done in the matter of the preparation of proper slides. Many of the slides shown in conjunction with the papers were excellent and showed the result of careful preparation and a knowledge of the principles of projection. On the other hand, a few of the slides were practically valueless due to the inclusion of too much matter on them and to the correspondingly illegible size of the lettering. Chairman Hinshaw commented on this at the end of the meeting and urged authors of papers to give more attention to the preparation of slides.

Due to illness, the authors of two papers were unable to be present and their papers were read by colleagues. Dr. Albert Koch's paper on "The Buna Rubbers" was read by C. A. Klebsattel of the Advance Solvents & Chemical Corp., while the paper on "Hevea Latex of Large Particle Size," prepared by J. McGavack, was read by E. M. McColm of U. S. Rubber.

Following the last technical paper on Wednesday afternoon, Dr. R. H. Gerke, Chairman of the Crude Rubber Committee, presented the Committee's seventh report. In brief, he reported that final revision of the tentative procedure for testing latex has been completed; that the procedure for quantitative dirt is being developed; that work is still proceeding on the problem of preparing samples of rubber from bales for plasticity determination; and that progress has been made in the development of suitable apparatus for determining the mechanical stability of latex.

With reference to the tentative standard figures for the vulcanization of plantation rubber, two mixings were suggested with curing and testing conditions given for each, as developed in cooperation with the London Advisory Committee for Rubber Research. All of the Committee's reports to date are being condensed and the condensed version will be published shortly.

Davey Assures Cooperation

Mr. W. S. Davey, who is replacing Edgar Rhodes on the staff of the Rubber Research Institute of Malaya, was on hand at the meeting and made a few remarks supplementing Dr. Gerke's report. He was pleased with the activities of the Crude Rubber Committee and gave his assurance of full cooperation in helping American rubber manufacturers toward their goal of obtaining better and more uniform plantation rubber.

At the short business session which followed the rendering of this report, it was decided to authorize the Chairman to appoint a Committee on Nomenclature to consider the suggestions made by Dr. Harry L. Fisher in his paper on "Nomenclature of Synthetic Rubbers." The action of the Executive Committee in passing on the reports of the Secretary and of the Treasurer were approved without the actual reports being read at the meeting. Closing the meeting, Chairman Hinshaw expressed his appreciation to the members for their attention during the technical sessions. He stated that the officers of the Division are always glad to carry out the wishes of the members, and urged that suggestions be made to better the work of the organization. After commenting on the improvement necessary in the preparation of slides, he suggested the advisability of submitting slides with each paper so that they might be received and checked in advance.

The Chairman also thanked the local section and all who assisted in making the meeting a success. He called attention to the excellent work which Secretary H. I. Cramer (of the University of Akron) has been doing and also reminded members of the Fall Meeting to be held in Boston which will celebrate the 100th anniversary of the discovery of the vulcanization of rubber. Full details of this celebration were disclosed by John M. Bierer, of the Boston Woven Hose & Rubber Co., Chairman of the Goodyear Centennial Committee, at the banquet, and the scheduled papers and planned events are given elsewhere in this issue.

The banquet, held on Tuesday evening, featured a talk on "Current Events" by General Hugh S. Johnson, noted lecturer and newspaper columnist. During dinner entertainment was furnished consisting of a pair of roving singers, a police department quartet, a tenor and a ventriloquist, along with a modern swing band. Before the guest speaker of the evening was introduced, Mr. Hinshaw, who acted as toastmaster, introduced Mr. Davey and made Verne L. Smithers, who headed the committee in charge of entertainment, take a bow, following which Mr. Bierer outlined the plans for the Goodyear Centennial Celebration.

Johnson Discusses Neutrality

In his speech, General Johnson commented on what the United States must do to achieve strict neutrality in any coming European war and explained the various bills now before Congress intended to achieve this aim. After the delivery of his prepared talk, the speaker answered numerous questions from the floor all endeavoring to draw him out on labor, business, political and international problems. He deftly answered or parried as each question warranted and succeeded in providing a most enjoyable evening for the guests.

In addition to Mr. Smithers, the following also served on the Entertainment Committee: Enos Baker (Binney & Smith), C. A. Bartle (DuPont), and S. G. Byam (DuPont).

As mentioned, one of the papers given during the Symposium on Synthetic Rubbers was that prepared by Dr. Koch on

Photo by Allyn K. Thayer

General Hugh Johnson in animated conversation with Chairman George K. Hinshaw at the banquet of the Rubber Division, while Vice-Chairman E. B. Curtis looks on.

"The Buna Rubbers." Because an abstract of this paper was not available for publication last month, we are presenting the full abstract herewith:

The Buna Rubbers. ***By Dr. Albert Koch, I. G. Farbenindustrie A. G., Leverkusen, Germany.***

For the past 15 years or more, intensive work has been done in Germany with polymeric materials, especially products whose basic compounds are dienes, such as butadiene, hydrocarbons closely related to isoprene which is the main constituent of natural rubber. As butadienes are available from American raw materials, these rubbers are of great interest to the United States. Various slides give considerable historical data bearing on the various investigations of these polymers. They show, for example, the realignment and the bonding of the molecules in the synthetic products which, in many cases, produced a product superior to natural rubber.

This is the reason for the superior heat resistance, the greater abrasion resistance and heat stability as compared to natural rubber which, when translated into practical terms, is the reason why automobile tires made from "Buna S" have delivered considerably higher mileage in actual usage in Germany. Further developments along these lines will still increase these desirable properties. The paper also points out that it was possible to control the polymerization and manufacture of these synthetic rubbers so as to produce the product known as "Buna N" or "Perbunan," which has the properties of resisting gasoline and lubricating oils, which is not true of natural rubber.

It is possible to produce extremely pure polymers which display good electrical insulating properties. Various polymers can be developed in the diene group with slight modifications which will produce the desired properties for special uses. The paper also points out that in the case of these Buna rubbers, practically the same antioxidants, accelerating chemicals and compounding pigments, softeners and so forth, as are used with natural rubber, can be utilized. With the various grades of Buna rubber to start with and the many compounds which are possible, thousands of useful formulas have and can be developed.

The paper also discusses various plasticizers and addition agents of various amounts of sulfur and various types of cures. Plans are now being studied looking toward the manufacture of these Buna rubbers in the United States from American raw materials.

New Rubber-Like Product

One of the more interesting papers given at the meeting at technical sessions held by divisions of the American Chemical Society other than the Rubber Division, was that on "Preparation of Two New Series of Organic Sulfur Compounds," prepared by George D. Palmer, Jr., S. J. Lloyd, W. P. McClure, Norman LeMaistre, W. S. Waring and L. W. Bachman, all of the University of Alabama. This paper, given at the April sixth morning session of the Division of Organic Chemistry, described a new process which may make possible the production of a new type of commercial synthetic rubber, as well as result in derivatives of value to the drug, dye, plastic and other industries.

One of the aims of the ten-year research covered by the paper was to prepare "complex and valuable organic compounds directly, of one step, by treating elements such as sulfur with the vapors of various simple and cheap organic compounds." New series of organic sulfur compounds have been prepared directly by contacting the molten element sulfur with the vapors of the simplest (as well as the more complex) coal tar products, such as benzene, toluene, carbolic acid and aniline.

A new rubber-like substance is one of the products synthesized by the new process, it was declared. This substance is created out of sulfur and chlorobenzine at a temperature of 240° to 260° C. It is this substance which may provide industry with a new type of synthetic rubber, the properties of which are not possessed at present by either crude or synthetic rubbers, thereby opening up new fields for rubber products.

Property Lost and Recovered

"A most interesting and remarkable property of this new substance," according to the paper, "is that the rubber-like property is lost when the substance is dissolved and is regained again upon precipitation with an acid. This may mean that cloth and similar substances may be impregnated with this rubber-like material."

Tentative Plan of the

GOODYEAR CENTENNIAL CELEBRATION

At Boston, Mass., September 13-15, 1939

To Be Held in Conjunction with the 98th Meeting of the A.C.S.

(As announced at the Meeting of the Rubber Division, A. C. S., held in Baltimore, Maryland, April 4-5)

Wednesday Afternoon—September 13

(General Meeting of the Entire Society)

What Is Vulcanization?—By E. B. Babcock, Chief Chemist, Firestone Tire & Rubber Co.
The Work of Thomas Hancock—By A. B. Newhall, Executive Vice-President, B. F. Goodrich Co.
The Work of Charles Goodyear—By R. W. Lunn, Managing Director, Leyland & Birmingham Rubber Co. (of England.)
The Rubber Industry Since 1839—By W. A. Gibbons, Director of General Development, U. S. Rubber Co.

Wednesday Evening—September 13

Banquet at the Hotel Copley-Plaza, Boston

The Rubber Industry—By P. W. Litchfield, President, Goodyear Tire & Rubber Co.
What the Rubber Industry Has Meant to the Automobile Industry—By W. S. Knudsen, President, General Motors Corp.
Vulcanization from the Physicist's Standpoint—By Karl T. Compton, President, Massachusetts Institute of Technology.
Vulcanization from the Chemist's Standpoint—By J. B. Conant, President, Harvard University.

Technical Sessions

Thursday and Friday, September 14 and 15

What Is Vulcanization?—By H. L. Fisher (Air Reduction Co.).
Theory of Acceleration—By L. B. Sebrell (Goodyear).
Effect of Vulcanization on Structure—By W. F. Busse (Goodrich).
Thermodynamics of Vulcanization—By Ira Williams (Huber).
Reinforcement as a Function of Vulcanization—By C. R. Park (Firestone).
Physical Changes Induced in Vulcanization—By W. W. Vogt (Goodyear).
X-Ray Studies of Vulcanization—By Prof. G. L. Clark (University of Illinois).
Effect of Variability of Rubber on Vulcanization—By Edgar Rhodes (British Rubber Producers' Research Organization).
Vulcanization of Latex—By C. E. Bradley (U. S. Rubber).
What Is Optimum Cure?—By J. C. Walton (Boston Woven Hose & Rubber).
Temperature Coefficient of Vulcanization—By R. H. Gerke (U. S. Rubber).

GOODYEAR CENTENNIAL COMMITTEE

John M. Bierer, Chairman

A. A. Somerville
C. R. Boggs
G. K. Hinshaw (Ex-Officio)
E. B. Curtis (Ex-Officio)

PLANS EXCHANGE OF COTTON FOR RUBBER

The proposal that the United States exchange its vast surplus holdings of cotton for crude rubber produced in the Far East was made by P. W. Litchfield, president, Goodyear Tire & Rubber Company, in an address to the company's stockholders at their annual meeting, held in Akron, Ohio, on March 27. If handled carefully, the Goodyear executive stated, such a transaction need not upset the markets for either rubber or cotton.

Referring to the fact that an emergency supply of crude rubber in this country has been discussed for some time, Mr. Litchfield said that the barter plan would be one effective method of securing such a reserve. At the same time the cotton growers of America would be substantially aided by the elimination of part of their tremendous surplus. The full text of Mr. Litchfield's comments on the subject follows herewith:

"Our source of crude rubber lies half way around the world on the plantations of Dutch and British East Indies. In the event of major conflict, as in the case of the last war, shipping would be disorganized and ships for bringing in sufficient crude rubber would not be available.

"The present national supply of crude rubber, including stocks in the hands of manufacturers and dealers and shipments in transit to the United States, represents scarcely more than our average five months' consumption and has been recently steadily declining. The effect of a ship scarcity would be immediately transmitted to our own industry, to the automobile industry, the power and light industry, and many other types of enterprise.

Reserve Stock of Rubber

"These possibilities suggest that it would be in the national interest for this country to lay in a reserve stock of rubber. Legislation looking to this end has already been introduced in Congress and provides for the accumulation not only of rubber but of other basic raw materials not produced in the United States. Moreover, a plan which seems to me to warrant serious consideration has been suggested whereby a reserve stock of rubber could be accumulated without incurring any great expense.

"In our own country, the Government is holding more than 11,000,000 bales of cotton, which it has purchased or accepted as collateral for loans to cotton producers. The presence of these large government stocks cannot fail to have a depressing effect on the cotton market, and there is little or no prospect that they will soon move into consumption.

"At the same time, the output of crude rubber is being arbitrarily held to 50% of what can be produced. It has therefore been suggested that it might be to the advantage of the United States and also Great Britain and Holland, which control about 90% of the world's rubber production, to exchange part of our surplus cotton for an emergency reserve of crude rubber. If handled carefully, such a transaction need not upset the markets for either rubber or cotton. In fact, it might well lead to higher domestic cotton prices through removal of part of the existing surplus.

"The rubber obtained by this country and the cotton obtained by Great Britain would be impounded as a special reserve. This rubber could be exchanged at stated intervals for the newly purchased rubber of American manufacturers to avoid deterioration. Thus, we would be protecting ourselves from a possible rubber shortage and at the same time be aiding the cotton growers of our own country by eliminating part of their surplus and finding an outlet for it. It would also aid planters in rubber producing countries to keep labor employed and reduce the costs of production."

Coming Events

Apr. 17-30. American Toy Fair, Hotel McAlpin, New York City.

Apr. 20. Canadian Rubber Group, University of Toronto, Toronto, Canada.

Apr. 21. Rhode Island Rubber Club, Narragansett Hotel, Providence, R. I.

May 2. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles.

May 15-17. American Institute of Chemical Engineers, Hotel Mayflower, Akron, Ohio.

May 22-June 8. World Automotive Engineering Congress, auspices S.A.E., New York, Indianapolis, Detroit and San Francisco.

June 26-30. Annual Meeting, A.S.T.M., Chalfonte-Haddon Hall, Atlantic City.

Sept. 13-15. Goodyear Centennial Celebration (in conjunction with 98th Meeting of the A.C.S.), Boston, Mass.

Oct. 15. 40th National Automobile Show, Grand Central Palace, N. Y.

Oct. 16-20. National Safety Congress & Exposition, Atlantic City, N. J.

Dec. 4-9. 17th Exposition of Chemical Industries, Grand Central Palace, N. Y. C.

Factory in Bulgaria

The "Gislawed" Company, Ltd., has been organized in Bulgaria to manufacture a variety of rubber products. The new company was established by the "Napred" Cooperative Society of Sofia, Bulgaria, and the "Fuerbuendet" Cooperative Co., Ltd., of Stockholm, Sweden, each of which owns 50% of the capital. A factory will be secured in Sofia.

OVERMAN CUSHION CO. WILL BE LIQUIDATED

A hearing held on March 31 before District Judge John W. Clancy in New York City for the purpose of considering why an order should not be entered for liquidating the estate of the Overman Cushion Tire Company, resulted in approval of such liquidation. Overman Cushion Tire, which has no connection with the present Overman Tire Co., Inc., petitioned for reorganization under Section 77B of the Bankruptcy Act last year.

In accordance with the court's order, the trustee, James J. O'Connell, of 2 West 45th Street, New York City, reported that he had on hand a balance of $29,220, of which sum $25,000 has been specifically set aside for payment to the Government as a compromise payment for its miscellaneous tax claims.

There is also on hand, in special account, the sum of $50,000 which was received from the Goodyear Tire & Rubber Company in settlement of all patent litigation. This sum is held subject to the claims of the Reconstruction Finance Corporation ($75,000), Charles T. Wilson Company ($25,000), Collector of Internal Revenue ($235,000), Robert W. Byerly ($41,903), and Jacob R. Schiff ($4,000).

Mr. O'Connell further reported that he may receive an additional sum of approximately $30,000 from the profits, if any, of the new Overman Tire Co., Inc., which may be earned over a period of ten years, not to exceed 10% of such profits per year. However, he reported that in addition to the prior claims cited there were a number of miscellaneous unsecured claims totalling approximately $61,000.

Claims already on file in the proceedings will stand as claims in bankruptcy now that liquidation has been approved, without the necessity of creditors filing any further proofs of claim. Krause, Hirsch & Levin, 225 Broadway, New York City, are the attorneys for the trustee in this action.

Fire Razes Akron Plant

The most disastrous fire in Akron in 27 years razed two of the four buildings operated by the Buxbaum Company at Home and East Tallmadge Avenues on March 23. Buxbaum operates as a scrap rubber company and also manufactures a line of tire repair materials, employing approximately 120. The fire started with a small blaze in grass along railroad tracks which run parallel to the Buxbaum plant, and spread rapidly to the piles of scrap tires and other rubber products in the factory yard and then to the buildings. First estimates set the damage at $250,000. The Akron fire department had considerable difficulty in controlling the fire due to bursting of its fire hose. As a consequence of the fire, an investigation into the fire department has been launched.

Have you contracted for space in the 1939 RUBBER RED BOOK? There is still time.

HAUSER AND FRANK ADDRESS N. Y. GROUP

Addresses by Dr. Ernst A. Hauser, Associate Professor of Chemical Engineering of the Massachusetts Institute of Technology, and Jacobus F. Frank, American representative of the Netherlands East Indies Government Gutta-Percha Plantation, were the highlights of the meeting of the New York Group, Rubber Division, A.C.S., held at the Building Trades Club in New York City on March 17. Decided approval was given by the approximately 200 members and guests attending the meeting to the new program arrangements, under which the technical session was held at 4:30 in the afternoon and dinner held at 7:00 in the evening. These program arrangements will be followed in the future.

Frank Discusses Gutta-Percha

The first speaker introduced by Chairman A. H. Nellen was Mr. Frank who first discussed the uses of gutta-percha in this country and then described the history and development of the Tjipiter Estates, owned by the Dutch Government. Following this talk, Mr. Frank showed a motion picture taken on the plantations which traced the production of gutta-percha from the gathering of the leaves to the production of both the white and yellow varieties. The picture indicated how scientific methods of cultivation and preparation have succeeded the former crude methods.

Dr. Hauser was the second and final speaker on the afternoon program. Taking as his subject "The Vulcanization of Rubber Under Stretch," Dr. Hauser reported the results of the latest series of experiments in his study of the vulcanization phenomena. He was aided in these experiments by I. N. Smith, an associate in the Department of Chemical Engineering at M.I.T.

Using dried films of accelerated latex rubber, a series of cures were carried out, the rubber specimens being maintained at different degrees of elongation during cure. After the samples were cured, combined-sulfur determinations and such physical tests as permanent stretch, modulus and tensile strength were made. The results of these tests were indicated by the speaker in a number of lantern slide charts and graphs. The results obtained demonstrate, first, that the samples which were cured at medium degrees of elongation exhibit a maximum permanent set; second, the tensile strength drops with increasing degrees of elongation-during-cure; and, third, the combined sulfur remains constant and is independent of elongation-during-cure.

Hauser Describes "Alsifilm"

The speaker offered his discussion on the basis of intermolecular sulfur bridging at low and medium degrees of elongation-during-cure, and stressed the point that the possibility of sulfur adsorption was taken into consideration for samples cured at high degrees of elongation.

1,000,000th Ford Tire

The tire factory of the Ford Motor Company at Dearborn, Michigan, which opened on January 3, 1938, turned out its one millionth tire last month. The tire was a white sidewall type, and will be placed on exhibition at the Ford Rotunda, the visitor's gateway to the Rouge plant. Production of Ford tires is reported to have reached the rate of 7,500 every 16 hours. Inner tubes, the production of which was recently started, are being turned out in excess of 1,000 per day.

At the conclusion of this address, Dr. Hauser spoke for a few minutes on "Alsifilm," a new film derived from aluminum silicate commonly found in clays such as bentonite. This film has many unusual properties which suggest its value for many purposes. For instance, it may be made resistant to water, acids, alkalis, and oils; it may be made transparent and crease-resistant; it may be combined with other materials, such as paper. Rights to "Alsifilm," developed at M.I.T., have been assigned to the Research Corporation, 137 Newbury Street, Boston, Mass.

A brief intermission was allowed at the conclusion of the technical session before dinner was served. Light entertainment was offered during and after dinner. The business session was held at the conclusion of the brief entertainment program. At this session, the group voted unanimously to dispense with the proposed dance in May, but to continue the practice of holding annual outings in the spring. The majority of those present favored a New Jersey location for the outing this year and a committee will be appointed to determine upon a suitable spot. Details of the outing will be made available later.

Technical Paper Contest

It was also voted to sponsor a technical paper contest restricted to the younger members of the industry, and unanimous approval was given to the following resolution prepared by the Executive Committee:

"Whereas: It is the consensus of opinion of the Executive Committee of the New York Group, Rubber Division, A.C.S., that it is desirable to encourage the younger technicians in the area covered by the New York Rubber Group to prepare and present instructive papers pertaining to some phase of the rubber industry.

"Be it resolved that the New York Group sponsor a contest in which may be entered a paper by any member of the Group under 35 years of age, for which a fund of $100 be set aside as prize money, the prize paper or papers to be read at the Fall Meeting this year."

All details of the contest will be formulated by a committee to be appointed by the Chairman and will be published in the trade press.

CHEMICAL ENGINEERS TO HONOR GOODYEAR

The annual spring convention of the American Institute of Chemical Engineers will be held at the Hotel Mayflower in Akron, Ohio, on May 15, 16 and 17. The meeting, which is expected to attract an attendance of more than 800, will honor the 100th anniversary of the discovery of vulcanization by Charles Goodyear.

George Oenslager of Goodrich has been named honorary chairman of the convention, while other noted Akron rubber technologists will have prominent roles in the program, including R. P. Dinsmore of Goodyear, E. B. Babcock of Firestone, and W. I. Burt of Goodrich.

Members of the Executive Committee for the three-day convention include A. W. Carpenter, Howard Fritz, J. W. Schade and H. Trumbull of Goodrich; J. T. Cox, Jr., Henry Palmer, and C. R. Park, of Firestone; and J. P. Maider of Goodyear.

R. I. Club to Meet

The first spring meeting of the Rhode Island Rubber Club will be held on Friday, April 21, at the Narragansett Hotel in Providence. Dinner will be served promptly at 7:00 P.M. Two speakers will appear on the program. C. W. Taylor, of Howe & French, Inc., will talk on "Lacquer Application and Reasons for Lacquering Rubber," while L. R. Yeager, of the Owens-Corning Fiberglass Corp., will describe the new glass textiles. The latter talk will be illustrated with motion pictures. Tickets for the meeting are $1.50 for members and $1.75 for non-members, with a choice of broiled halibut or broiled lamb chop dinners. David C. Scott, Jr., of the Henry L. Scott Co., Providence, R. I., is secretary-treasurer of the Club.

Callaway Units Move

All selling units and divisions of the Callaway Mills, including industrial fabrics for the rubber industry, have been consolidated at 295 Fifth Avenue in New York City. Prior to this move, the company maintained divisions at the Fifth Avenue address, as well as at 345 Madison Avenue and 1 Park Avenue. The entire third floor of the building on Fifth Avenue has been rented to accommodate the various divisions.

New Barrett Products

A group of hydrogenated products has been added to the line of coal tar materials sold by the Barrett Company, 40 Rector Street, New York City. Included in the new group are cyclic hydrocarbons, cyclic alcohols and cyclic ketones. All of the new additions are said to find application in the rubber industry due to their utilization as solvents.

Names in the News

L. Gordon Campbell, formerly manager of the lubricating bulk sales department of the Standard Oil Company of Indiana, joined the technical sales force of Moore & Munger, New York City, on April 1.

Robert Cowen, formerly technical director and production manager of the Conklin Manufacturing Co., has been named vice-president and plant manager of the Roxalin Flexible Lacquer Co., Elizabeth, N. J.

J. L. Cochrun, Jr., son of the vice-president in charge of sales of the Seiberling Rubber Co., Akron, has been appointed representative for that company in South America. He has already sailed to take up his new duties.

Malcolm G. Anderson, development department, Goodyear Tire & Rubber Co., has left for England where he will succeed H. A. Brittain as manager of the development department at Wolverhampton. Mr. Brittain has been named superintendent of the English plant.

Harry I. Belknap, superintendent of Goodyear's plant in Java from 1934 to 1938 was named superintendent of Plant 1 in Akron last month to succeed H. T. Gillen. The latter, a veteran of 42 years in the rubber industry, will retain the title and position of consulting superintendent.

H. K. Worthington will represent Sprout, Waldron & Co., of Muncy, Penna., in the eastern and western sections of New York State until further notice. He takes over the duties of C. L. BeVier who is no longer in the company's employ.

Evert D. Cobb has been appointed direct factory representative for the Stanley Chemical Co., East Berlin, Conn., in the Ohio territory. He received several months of training at the factory before taking over the territory.

W. H. Fleming, formerly superintendent of Goodyear's plant in Los Angeles, has been named manager of the recently-organized General Merchandise Control Department of the company at Akron. He has been succeeded in California by F. A. Steele, formerly superintendent at the plant in Wolverhampton, England.

Nat E. Berzen, president of Nat E. Berzen, Inc., and Julius Muehlstein, of H. Muehlstein & Co., Inc., both of New York City, were elected president and vice-president, respectively, of the Scrap Rubber Institute of the National Association of Waste Material Dealers, Inc., at the annual meeting of the Institute held on March 22nd in Chicago.

T. H. Young, associated with the advertising and sales departments of the U. S. Rubber Company since 1916, has been appointed director of advertising to succeed Walter Emery who has been named head of the commercial research department.

Charles A. Higgins, associated with the Hercules Powder Co., Wilmington, Delaware, since 1915, was elected president of the company last month succeeding R. H. Dunham who continues with the company as chairman of the board of directors.

David S. Hunter, advertising manager, A. Schrader's Son Division of Scovill Manufacturing Co., Brooklyn, N. Y., and Miss Mary Lowery Alison, of Bayonne, N. J., were married in New York City last month. The couple will reside in the vicinity of New York City.

T. G. Graham, vice-president, B. F. Goodrich Co., Akron, was one of the keynote speakers at the third session of the McGraw-Hill Public Relations Forum, held in the Hotel Statler, Cleveland, on April 5.

Ray R. Semler, superintendent of the Barberton, Ohio, plant of the Midwest Rubber Reclaiming Co., was elected to the board of directors of that company on March 17. He has been connected with Midwest for 12 years.

William E. Crofut, president, Forest City Rubber Co., Cleveland, was paid an unusual tribute last month when the Cleveland Young Men's Christian Association named its island in Lake Timagami, Ontario, for him. Mr. Crofut has been active in Y.M.C.A. work for almost three decades.

H. B. Soulen, factory manager, Mansfield Tire & Rubber Co., Mansfield, Ohio, addressed a meeting of the Mansfield Rotary Club on March 7 on the "Centennial of Rubber."

Jerome T. "Jerry" Shaw, editor of *Tires*, was given a testimonial dinner in New York City on March 8th at the Park Central Hotel by the Greater New York Tire & Battery Association. He has been active in the Association since its founding almost 20 years ago.

Akron Chemical Moves

The Akron Chemical Company recently moved its offices and warehouse to 1025 Sweitzer Avenue in Akron, Ohio. A larger warehouse and increased laboratory facilities are said to enable the company to render better service to its customers. The new telephone number is JEfferson 2108.

Plan Gas Mask Plant

The War Department awarded a contract of $185,750 on March 23 to the Goodyear Tire & Rubber Co. for the construction of a gas mask assembly plant in this country and the production of an undisclosed number of masks. The award was made as a result of the recent disclosure to Congress that the Army had insufficient masks to equip even the regulars, disregarding the National Guard. The recently approved $552,000,000 arms program includes funds to increase the existing equipment.

To Make Heels and Soles

The Beebe Brothers' Rubber Company has been organized in Nashua, New Hampshire, by E. Colman and John H. Beebe, and has already acquired a factory for the manufacture of heels and soles on Marshall Street. The factory property consists of approximately five acres of land and buildings having about 40,000 square feet of floor space. Operations will be started sometime in June, according to present plans.

LOS ANGELES NEWS

A new warehouse building, approximately 275 feet square, is being built by the U. S. Rubber Company. Scheduled for completion about June 1, the new building will cost approximately $150,000. It will be of reinforced concrete construction, one story in height.

J. H. Minor, 232 South Union Place, Los Angeles, is promoting an organization called the National Institute of Retread Standards in the Los Angeles area. The purpose of the organization is to work toward standardization in the quality of retreaded tires.

The Los Angeles Group, Rubber Division, A.C.S., will hold its next meeting at the Mayfair Hotel in Los Angeles on May 2. The program will be supplied by the Kirkhill Rubber Company. Mr. Kirk Hill, head of the concern, will show moving pictures of various manufacturing processes taken in his factory, and will also give an illustrated talk on his recent trip to the West Indies and South America.

A strike in the plant of the Darnell Corporation, Long Beach, called last month, was still unsettled on April 4.

H. N. Wayne, formerly associated with the Waynway Rubber Company, which recently made an assignment for benefit of creditors, is now in the employ of the Golden State Rubber Mills. His son, Arthur N., who was also connected with the bankrupt company, has taken a position in the Hawaiian Islands. A portion of the building formerly occupied by Waynway is now being used as a warehouse by the Kirkhill Rubber Co.

PLASTICS FEATURED AT CHICAGO MEETING

The growing use of plastic products was the theme of the meeting of the Chicago Group, Rubber Division, A.C.S., held at the Hotel Sherman in Chicago on March 31. The program included a talk on "Recent Developments in Modern Plastics" by Edward R. Dillehay, chief chemist of the Richardson Company, Melrose Park, Illinois, and two motion pictures on the same subject.

Mr. Dillehay described the chemical constituents and physical properties of each of the many types of synthetic resins offered for the manufacture of molded products. In making his talk, he first showed the audience a special type of molded product and then discussed the details to be observed in the manufacture of such products, starting with the best type of resin to be used and including the method of handling.

In addition, the speaker described the miscellaneous equipment used in the molded plastics industry. He continually supported his talk with actual samples. Literally, hundreds of samples were displayed. The presentation brought on a long discussion period, indicating the growing interest displayed by rubber manufacturers in synthetic resins.

Following the discussion period, two motion pictures were shown. The first film, called "Modern Plastics Preferred," was presented through the courtesy of *Modern Plastics Magazine*, while the second, "Developments in Bakelite Resins," was shown by the Bakelite Corporation. Both films were of great help in visualizing the many points brought out in Mr. Dillehay's paper.

L. A. GROUP HEARS TALK ON NEOPRENE

Approximately 85 members and guests listened to a lecture on the subject of neoprene, given by H. J. Jordon of E. I. du Pont de Nemours & Co., Inc., at a meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel in Los Angeles on April 4. Mr. Jordon discussed the advantages of neoprene over natural rubber but mentioned several uses in which rubber still was superior to the synthetic product. He cited the aviation and oil industries as being among those where neoprene was finding practical application.

A second speaker on the program was Edgar M. Wilson, general agent of the President Lines, Ltd., of Los Angeles. Mr. Wilson discussed the American Merchant Marine and presented arguments in favor of a subsidy in foreign trade. Since the speaker had lived in the Far East for many years, his talk proved of especial interest. At the conclusion of his address, Mr. Wilson was presented with various rubber products, including a steering wheel, beach ball, soap dish, bath mat and a shoe cleaner. These products were donated by rubber manufacturers in the Los Angeles area.

Goodrich Statistics

A recent survey of the approximately 6,000 workers employed in the Akron factories of the B. F. Goodrich Company, revealed the following data: The average age of male workers is 42 years and the average of female workers 37 years; over one-fifth of male workers are 50 years of age or older, while only one-seventh are under 30; approximately one-seventh of female workers are 45 years of age or older, and only one-ninth are under 25; 9 out of 10 factory workers have been with the company 5 years or more; 6 out of 10 ten years or more; 1 out of 8 twenty years or more. The survey indicated that less than 40 workers have had less than two years of service.

The door prize of the evening, a steel card table with detachable corner trays, presented by THE RUBBER AGE through J. Edward Tufft, its Los Angeles representative, went to L. G. Koenig, while a special prize, an electric clock donated by the C. P. Hall Company through its representative, R. D. Abbott, was won by Garvin Drew, chairman of the group. A colored quartet furnished entertainment at the meeting.

AKRON GROUP MEETS AND ELECTS OFFICERS

Election of officers for the 1939-40 term, and a paper delivered by W. J. McCortney of the Engineering Department of the Chrysler Corporation, featured the Spring Meeting of the Akron Group, Rubber Division, A.C.S., held at the Mayflower Hotel in Akron on March 24. Approximately 300 members and guests attended the meeting. The following officers were elected: *Chairman*, Ralph LaPorte (Seiberling Rubber); *Vice-Chairman*, H. V. Powers (Goodyear); *Secretary-Treasurer*, T. L. Stevens (C. P. Hall).

Speaking on "What the Automotive Industry Expects of the Rubber Chemist," Mr. McCortney took the rubber industry to task for its shortcomings and urged further research and development. He stated that as high as 25% of the rubber parts purchased by Chrysler are being rejected for imperfections, and described some methods used to determine proper specifications. He also warned rubber manufacturers to pay more attention to the plastics industry since the use of plastics at present barely scratches the surface of the potential use in automobiles.

The meeting concluded the winter's activities of the group. The next function will be the annual summer outing, usually held in June. Present at the meeting were R. B. Searight and Guiseppe Vidale of the Pirelli Company of Milan, Italy.

CAMPBELL IS UPHELD AS AETNA PRESIDENT

In a decision handed down on March 29, the Ohio Supreme Court upheld the prior decision of the Cuyahoga County Appellate Court holding that Stanley B. Campbell and other officers elected by the so-termed insurgent stockholders are the rightful officers of the Aetna Rubber Company of Cleveland, Ohio. The other officers are Robert A. Christian, treasurer, and R. A. Gillis, secretary. Mr. Campbell is president. The new officers have already taken over their duties.

The dispute arose over the voting privileges of common and preferred stockholders. At a special meeting of stockholders last December, Charles A. Heil, then chairman of the board, stated that insufficient proxies were on hand to warrant holding of the meeting and declared it adjourned. A group dissented from this opinion, held its own meeting, and elected Messrs. Campbell, Christian and Gillis.

The incumbent officers, headed by Mr. Heil, maintained that the preferred stock of the company had a voting power of 89 to 1 against the common stock, due to the original by-laws of the company and to a subsequent revision in the capital structure of the firm, but the insurgent group, headed by Mr. Campbell, insisted that the common stock had equal voting power with the preferred.

A legal battle over which faction actually represented the company was started when the Heil faction filed a *quo warranto* petition in the Cuyahoga County Appellate Court. In a 2-to-1 decision, this court held that the voting power of both common and preferred shares was equal and therefore the Campbell group was within its rights. The Heil faction appealed this decision, which the Ohio Supreme Court has now upheld.

Canada Hears Nelson

Dr. William G. Nelson of the Detroit Plant of the United States Rubber Company was the chief speaker at a meeting of the Ontario Rubber Division of the Canadian Chemical Association, held at the University of Toronto, in Toronto, Canada, on March 28. Approximately 30 members and guests attended the meeting. Selecting as his subject, "The Physical Testing of Rubber," Dr. Nelson stressed the need for thorough tests of raw materials and briefly described the equipment and methods used in the U. S. Rubber laboratory. He illustrated his talk with lantern slides.

Rupert to Speak

F. E. Rupert, of the Rubber Service Division, Monsanto Chemical Co., Akron, Ohio, will be the chief speaker at the next meeting of the Ontario Rubber Division of the Canadian Chemical Association on April 20 at the University of Toronto in Toronto, Canada. He will discuss "Modern Rubber Compounding and Processing in the Cable Industry."

FINANCIAL NEWS

MANSFIELD TIRE CO. FILES STOCK ISSUE

Mansfield Tire & Rubber Co., Mansfield, Ohio, has filed a registration statement with the Securities and Exchange Commission covering a proposed offering of 47,615 common shares. Otis & Co., investment firm of Cleveland, Ohio, has been named underwriter. Of the shares proposed, 13,800 are being purchased from the company and 33,815 from present stockholders.

With three exceptions, all stockholders, including the principal executive officers, are retaining 90% of their holdings. The public offering price is $15.50 a share. Proceeds of the shares to be bought from the company will be used to reimburse the company for expenses incurred in recently adding to its plant facilities, according to report.

Mansfield Tire, incorporated in 1912, manufactures tires and tubes and confines its activities to the replacement field. The registration statement revealed that net sales amounted to $7,496,790 in 1936, to $10,482,362 in 1937, and to $11,812,039 last year. Gross sales in the first two months of the current year were said to be substantially higher than those in the corresponding period of 1938.

Kleinert Rubber Co.

For 1938: Net profit of $211,548, equal to $1.27 each on 166,095 shares of common stock, excluding 23,905 shares held in the treasury, which compares with net profit of $119,297, or 71 cents each on 168,275 shares of common stock, in the previous year.

Anaconda Wire & Cable

For 1938: Net loss of $97,781, which compares with a net income of $1,985,242, or $4.70 each on the 421,981 capital shares outstanding, in the previous year. The consolidated balance sheet, as of December 31, 1938, shows current assets of $10,364,790 and current liabilities of $2,619,233, which compares with $12,153,127 and $4,642,322, respectively, at the end of the previous year.

Master Tire & Rubber

For 1938: Net profit of $135,178, equal to 53 cents each on 89,225 shares of common stock after preferred dividend requirements, contrasted with net loss of $116,221 in the previous year. Report marks first year company has shown net earnings since 1931. Net sales in 1938 totalled $3,132,538 as compared with $2,326,800 in the previous year. The consolidated balance sheet, as of December 31, 1938, lists current assets of $715,528 against current liabilities of $376,310, which compares with $507,846 and $342,615, respectively, last year.

Columbian Carbon Co.

For 1938: Net income of $2,757,539, or $5.13 each on 537,406 no-par capital shares outstanding, which compares with $4,466,249, or $8.31 a share, in the previous year. The decline in earnings was attributed to the abnormally low domestic price of carbon black as well as to the general business decline. Consolidated current assets on December 31, 1938, amounted to $6,219,419, while current liabilities totalled $1,047,019.

Collyer Insulated Wire

For 1938: Net loss of $62,473, which compares with a net income of $208,547, equal to $1.39 a share on 150,000 capital shares, reported in the previous year. Collyer recently dissolved the Providence Insulated Wire Company, a manufacturing subsidiary.

Intercontinental Rubber

For 1938: Net loss of $62,810, which compares with net income of $184,235, equal to 31 cents each on 595,832 shares of capital stock, reported in the previous year.

Seeks Reorganization

The Mayfair Chemical Corporation, Carlstadt, N. J., filed a petition under Chapter X of the Amended Bankruptcy Act of June 22, 1938, in the United States District Court at Newark, N. J., on March 13. The petition sought reorganization of the company, the liabilities of which were placed at $32,206 and the assets at $37,800. Subsequently, Walter G. Winne and Elliot Meyer, the latter president of the company, were named as trustees. The latest report is that Besser & Company, certified public accountants of Newark, N. J., have been retained (by order of the court) to make an examination of the books and records and the financial affairs of both the Mayfair Chemical Corporation and the Standard Latex Products Corporation, an affiliated concern. In addition to the Carlstadt plant, where prophylactics and other dipped goods were made, Mayfair Chemical had a sales office at 100 Fifth Avenue in New York City. The Standard Latex concern operated a factory at Paterson, N. J.

Bata Factory Possible

According to John B. Atkinson of Boston, North American representative of the famous Bata Shoe Company, Jan Bata, son of the founder, is considering the construction of a shoe plant in this country. Mr. Bata is due here in the spring. The decision is said to be prompted by the fact that a number of the company's factories abroad are located in territory recently absorbed by Germany. Bata owns approximately 2,600 acres of land on the Eastern seaboard, near Baltimore, Maryland.

Raybestos-Manhattan, Inc.

First Quarter: Net profit of $266,530, equal to 42 cents a share, which compares with a net loss of $171,448 reported in the corresponding period of the previous year.

L. H. Gilmer Co.

For 1938: Net profit of $[illegible] which compares with one of $112,268 in the previous year. Net sales in 1938 totalled $1,049,964 against $1,326,862 in 1937.

AN APPROVED CLAY

CROWN CLAY

SOUTHEASTERN CLAY COMPANY
AIKEN, SOUTH CAROLINA

INTERNATIONAL PULP CO., *41 Park Row, New York, N.Y.*

SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER

Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.

LIBERAL WORKING SAMPLE FURNISHED FREE

SCRAP RUBBER TRADE COVERED IN SURVEY

Although the dollar value of the scrap rubber trade is relatively unimportant, the tonnage of scrap rubber moving in international trade annually in the 1933-37 period averaged higher than the entire world production of crude rubber during 1901-05. This is one of the interesting revelations from a survey of the international shipments of scrap rubber since 1924 recently completed by the Leather and Rubber Division of the Bureau of Foreign and Domestic Commerce.

The United States is the chief source of supply for scrap rubber, although most of the annual collection is consumed in the domestic manufacture of reclaimed rubber. Exports of scrap rubber from this country were close to 50,000,000 pounds a year even during the depression, and exceeded 76,000,000 pounds in the peak year of 1937. They dropped off 20% from this figure in 1938.

United Kingdom Close Second

In some years the United Kingdom has been a rather surprisingly close second to the United States in volume of exports, particularly because of the fact that the use of reclaim has not received the same encouragement in England as it has in this country. Then, too, English shipments are facilitated by the proximity of the European markets. In the 1925-29 period, Canada ranked third among exporting countries, with France in fourth place, and Germany fifth. Exports from Germany and Italy in recent years, however, have been inconsequential due to official restrictions on scrap rubber.

It is estimated that figures compiled in the survey represent approximately 95% of the international shipments of scrap rubber. During the period of the Stevenson Restriction Scheme the trade was stimulated by high prices for crude rubber and reached a peak of 133,663,000 pounds in 1929. During the depression it dropped to approximately 90,000,000 pounds per year, but with the rise of crude rubber prices around 1934 annual shipments began to show a steady increase, reaching approximately 176,811,000 pounds, an all-time peak, in 1937.

The major use of scrap rubber in the principal rubber manufacturing countries, as it is in the United States, is in the production of reclaimed rubber. Some direct use of scrap tires is made in this country and a few others in the manufacture of heavy mats, tire boots and blowout patches, while scrap inner tubes are used for making rubber bands. This is not the case in Spain, however, where a large industry has grown up devoted to the manufacture of footwear from worn tires. In Southern France a similar industry exists in the production of cheap footwear for peasants.

Imports of scrap rubber into the United States are received mainly from Canada, with smaller amounts being received from Europe, and occasional minor imports from Australia, Japan, Argentina and other countries. United States imports were formerly much larger than in recent years, 20,448,000 pounds being imported in 1927 as against 7,310,000 last year. Canada imports substantial quantities of scrap rubber from the United States for use in reclaiming. The United Kingdom imports less scrap rubber than does Canada, as a rule, having a large surplus of domestic scrap for export.

Germany ranked third among European importers of scrap rubber in the 1927-29 period, after which imports declined until the introduction of the current restriction scheme when they were resumed at about the pre-depression level for 1934 and 1935. With the introduction of strict government measures of rubber conservation in 1936, German imports jumped sharply to a new high record of approximately 23,000,000 pounds, and the following year a total of 90,000,000 pounds was reached, of which 30,000,000 came from the United Kingdom and 29,000,000 from the United States.

Other large markets for scrap rubber are found in the Far East, the survey indicated. China and Hongkong, like Spain, have been far more important as consumers of scrap rubber than as users of new crude rubber. Although these two markets have been affected by the war in China, imports in 1937 and 1938 were as a whole well-maintained. Cessation of hostilities in China would probably result in a sharp increase in the total of scrap rubber imported annually.

Japan Is a Big Importer

Japan averaged approximately 3,000,000 pounds of scrap rubber imported annually from 1927 through 1936, but imported 11,000,000 pounds in 1937, and took 16,634,000 pounds from the United States alone in 1938. It has been estimated that exports from this country to Japan during the current year will total more than 17,500 tons, a record high for the trade between the two countries. If this total is actually reached, Japan will become the biggest scrap rubber importer in the world.

Japan's increased purchases of scrap rubber are believed to be due to stringent financial conditions in Tokyo, increasingly severe governmental restrictions of crude rubber imports, and failure of the country's scientists to devise a successful formula for the production of synthetic rubber. Practically all scrap imported into Japan goes into the production of reclaim.

New England News

State wages and hours bills designed to cover intrastate industries have been introduced in most of the New England capitols during the current sessions of state legislatures. In most of the six states the proposals seem unlikely to pass, with Massachusetts still a battleground where the outcome is in doubt.

"Baby Wagner Acts" and similar measures sponsored by labor groups have also been presented in several states, but have met a rather cool reception. Throughout New England there appears little prospect of new legislation which will hamper business, although some unimportant measures may be passed as a sop to organized labor.

The Fabrikoid Division of E. I. du Pont de Nemours & Co., Fairfield, Conn., has developed two new types of rubber fabric materials which are said to offer immense possibilities for development. One is a carpet material which is reported to resemble fine woolen carpets and to have "unbelievable" wearing qualities. The other is a leather-like rubberized fabric designed for use in upholstering furniture. The carpet material is being given a severe test in the Du Pont exhibit at the San Francisco fair, and is now being installed in Du Pont's theater at the New York World's Fair.

Describing the new upholstery material, a company statement says "like genuine leather, it consists of a fibrous structure held by a scientifically balanced binder designed to withstand the elements and physical requirements of good upholstery material. A special process renders the surface smooth and leather-like, giving what is best described as a case-hardened finish."

The waterproof department of the footwear division of United States Rubber Company, at Naugatuck, Conn., will work a five-day week through the spring season and probably until the annual shut-down in July. The tennis department has been operating on this basis for some time. A five-day schedule will be maintained throughout April in the fabric shoe mill. Factory Manager Walter H. Norton said the company is "making every effort to give 4,600 operators 220 days' employment during 1939."

At plants of the Naugatuck Chemical Division, employees who were laid off last year have been recalled. Announcement has been made at the Shoe Hardware Division, Waterbury, that a week's vacation with pay will be given all employees who have been with the company a year to June 1. It is the third year such vacations have been awarded.

Rubatex Distributors, Inc., has been chartered in Ridgefield, Conn., by Henry Steele Roberts, Mary Seldon Roberts and Gerald M. Gordon. Mr. Roberts and his father hold the patents on the "Rubatex" process.

Obituaries

John Jay Watson

John Jay Watson, president of the Lee Tire and Rubber Co., Conshohocken, Penna., and noted financier and agriculturist, died of a heart attack while at work in his office in Albany, Georgia, on March 30 at the age of 64. He owned a plantation, called Hickory Grove, near Albany, and usually spent the winter months at the plantation. At the time of his death, he was also president of the International Agriculture Corporation.

Mr. Watson was born in Jamestown, R. I., attended the district schools, went to Rogers High School in Newport, and studied at the Bryant and Stratton Business College in Providence. After being graduated from the latter institution, he aided in running his father's farm, but in 1896 embarked on his business career when he joined the Industrial Trust Company of Providence. Three years later he took his first executive position as treasurer of the old Joseph Bannigan Rubber Co.

In 1901, Mr. Watson came to New York as treasurer of the U. S. Rubber Company, later serving as president of two of its subsidiaries, the General Rubber Company and the Rubber Goods Manufacturing Company. It was as head of General Rubber that he fought for and obtained the first authorization for the establishing of American-owned plantations in the Far East. He personally studied rubber at its source in Sumatra, Java and other centers.

Retiring from U. S. Rubber in 1910, Mr. Watson returned to the banking field with the firm of Watson & Pressprich, and was also instrumental in organizing the Newport Trust Company about this time. In 1913 he was elected vice-president and treasurer of the International Agriculture Corporation, and in or about the same year aided in the organization of the Lee Tire & Rubber Company. Elected as president of the agricultural firm in 1923, he retained that office until his death.

Mr. Watson took an active part in the politics of his native state around the turn of the century. In 1897 he succeeded his father as Moderator of Jamestown and was elected to the Rhode Island House of Representatives in 1899, serving five years in the latter capacity. He was also an alternate delegate to the Republican National Convention in 1904.

His social and business affiliations included memberships in the Chamber of Commerce of the United States, Rhode Island Historical Society, Society of Colonial Wars, Sons of the Revolution, French Legion of Honor, and the Union League, Metropolitan, New York Yacht and Piping Rock clubs.

Funeral services were held on April 2 at his summer home in Jamestown, R. I., his birthplace, with Rev. Albert C. Larned conducting. Interment was in Cedar Cemetery at Jamestown.

John F. Newman

John F. Newman, factory superintendent of the Vulcan Proofing Company, Brooklyn, N. Y., died in the Deaconess Hospital in Boston, Mass., on March 12, at the age of 49, following a brief illness.

Born in New York City, Mr. Newman's early training and business experience was in the field of structural engineering and he handled several responsible assignments on subway construction in New York. He also handled the installation of tire manufacturing machinery in the Brooklyn factory of the old C. Kenyon Company and after completing the installation was induced to remain with that company. Subsequently, he became superintendent of the plant.

In 1930, Mr. Newman was made factory superintendent of the Vulcan Proofing Company and was still serving in that capacity at the time of his death. He was well known in Masonic circles and was also a member of the Elks organization. Funeral services were held in Brooklyn with interment in Evergreen Cemetery. He leaves a widow.

Thomas W. Morris

Thomas W. Morris, inventor of the Morris automatic trimming machine for removing the overflow from molded rubber goods and one-time rubber technologist in the employ of the government, died recently from pneumonia. Born in Pleasant Valley, Ohio, in 1871, Mr. Morris joined Goodrich at Akron at the age of 16. Seven years later he became superintendent for Morgan & Wright in Chicago, remaining with that company for ten years during which time he helped organize the Chicago Tire & Rubber Co. Subsequently, he acted as superintendent for the La Crosse Rubber Mills, the Cudahy Rubber Company and the Dryden Rubber Company, respectively. In 1917 he invented the Morris automatic trimming machine and devoted the remainder of his life to his invention. Funeral services were conducted in Akron, with interment in Mt. Hope Cemetery. He leaves a widow, son and daughter.

William H. Meese

William Henry Meese, vice-president of the Western Electric Co., and general manager of its Point Breeze plant for the past ten years, died of a heart ailment at the Union Memorial Hospital in Baltimore, Md., on March 26 after a three-weeks' illness. He was 55 years of age.

Born in Michigan City, Indiana, Mr. Meese was graduated from the University of Michigan with a B.S. degree in electrical engineering in 1905, and entered the employ of Western Electric the following month. By 1910 he had advanced to chief of the investigation department and in 1911 was sent abroad in the interests of the company, remaining abroad until 1916.

Mr. Meese spent the next several years in various executive posts at the company's Hawthorne Works and at the New York offices, and was elected a vice-president in 1928. In 1929 he was assigned to the Point Breeze Works, which was then under construction, and acted as general manager of that plant until his death. He leaves two daughters.

George Mooney

George Mooney, who was associated with the H. O. Canfield Co., Bridgeport, Conn., for more than 45 years, died recently of heart disease. Born in Ireland in 1878, Mr. Mooney came to this country when still a child and went to work for the late H. O. Canfield in 1891. He acted as assistant foreman, foreman of the tubing and cutting departments, and assistant general superintendent, respectively, occupying the latter position from 1913 until his retirement due to ill health in 1937. Mr. Mooney was a member of the National Guard and the Foresters of America. Funeral services were held in Stratford, Conn., with interment in St. Michael's Cemetery. He leaves a widow.

Rubber Trade Board

The Minister of Labour of the United Kingdom has established a Trade Board for the rubber manufacturing industry in Great Britain. All branches of the industry, with the exception of rubber reclaimers for whom a separate board will be established, fall under the jurisdiction of the new board. The board has the power to regulate hours and wages, and is made up of 15 representatives of employers, 13 representatives of the employees, 3 appointed members, and a secretary. The latter is Mr. R. J. Humphreys, Metropole Buildings, Northumberland Avenue, London, W.C. 2, England.

New Canadian Firm

Edward Barringham, formerly president of the Canadian General Rubber Company, which he founded, has organized the Barringham Rubber Co., Ltd., at Oakville, Ontario, Canada. The new company, which is located in the former plant of the General Tire & Rubber Co., will manufacture baby pants, crib sheets, rain capes, bathing caps, etc., as well as a number of sponge rubber products.

Appoint Canadian Agent

J. M. Huber, Inc., New York City, manufacturers of carbon blacks and clays for the rubber and other industries, have appointed Charles Tennant & Co. (Canada), Ltd., as Canadian representatives. The Tennant Company maintains offices at 372 Bay Street, Toronto, and 206 Canada Cement Building, Montreal.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, APRIL 10, 1939

Crude Rubber

WEAKNESS in the foreign rubber markets, exemplified by poor cables, caused the price of crude rubber on the Exchange to drop from 16.66 on March 11, high for the period, to 16.12 on March 17. Under the combined pressure of these cables and a lower securities market in this country, the price broke sharply to 15.80 on March 18, low for the period. Better cables, factory buying and a stronger securities market brought the price back to the 16-cent level, but renewed weakness from abroad broke it again to 15.90 on April 4. The price has tended to be a little firmer in the past few days based upon interest and inquiries from factory interests for the most part, although there has been some commission house activity. The trade expects a higher price level shortly when the Government begins to function on its proposal of bartering cotton, wheat and other surplus agricultural products in this country for rubber, tin and other commodities from abroad. Announcement of this plan was made today (April 10) by Senator Byrnes of South Carolina. Quotations in the outside market, Exchange, London and Singapore, follow:

As of April 10

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.16⅛
July-September	—	@	.16⅛
October-December	—	@	.16⅛
No. 2	—	@	.16
No. 3	—	@	.15⅞
No. 4	—	@	.15¾
Thin Latex Crepe	—	@	.17⅞
Thick Latex Crepe	—	@	.18½
Brown Crepe, No. 1	—	@	.15⅞
Brown Crepe, No. 2	—	@	.15¾
Amber Crepe, No. 2	—	@	.15⅞
Amber Crepe, No. 3	—	@	.15¾
Brown Crepe, Rolled	—	@	.14½

Latex—

Normal, per lb., carload lots	—	@	.19

Paras—

Up-River, fine	—	@	.13⅝
Acre Bolivian, fine	—	@	.13¾

Balata—

Surinam sheet	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Buyers—April 6

July-September	8 1/16	@	8 3/16d
October-December	8⅛	@	8¼d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—April 6

July-September	—	@	7 31/32d
October-December	—	@	7 31/32d

Reclaimed Rubber

Reclaimers report that business continues fair with increased calls from the tire and mechanical goods divisions of the industry. The trend in coming months is dependent on the action of the automotive industry which so far has held up well. Although consumption of reclaim in February was under January, the percentage of reclaim consumed to crude rubber increased from 28.1 to 30.9%. There has been no change in prices since our last report.

Shoe

Unwashed	lb.	.06½	@	.06¾
Washed	lb.	.10	@	.10¼

Tube

No. 1 (Floating)	lb.	.12	@	.12¼
No. 2 (Compounded)	lb.	.08	@	.08¾
Red tube	lb.	.08	@	.08¼

Tires

Black (acid process)	lb.	.07	@	.07¼
Black, selected tires	lb.	.06	@	.06¼
Dark Gray	lb.	.09¼	@	.09¾
White	lb.	.11½	@	.12
Truck, Heavy Gravity	lb.	.05½	@	.06
Truck, Light Gravity	lb.	.07	@	.07½

Miscellaneous

Mechanical blends	lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Dealers declare business is good although some uncertainty has been revealed in the past week or so due to war scares from Europe. Prices have increased slightly on auto tire peeling, solid truck tire and red inner tube stocks since our last report. The stock situation remains about the same. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	17.50	@	18.50
Mixed auto	ton	12.00	@	13.00
Beadless tires	ton	14.50	@	16.00
Clean solid truck tires	ton	23.00	@	25.00
Boots and shoes	ton	17.50	@	19.00
Arctics, untrimmed	ton	13.00	@	15.00
Inner tubes, No. 1	lb.	.07	@	.08
Inner tubes, No. 2	lb.	.03¾	@	.04
Inner tubes, Red	lb.	.03⅝	@	.03¾

Cotton

After advancing to 9.15 on March 10, a new high for the year, the price for middling uplands on the Exchange started to sag and acted erratically in a narrow range for the balance of the month. Major factor in the erratic movement of the price was confusion emanating from Washington and the surplus of plans introduced to move cotton. Dropping to 8.89 on March 18, the price recovered to 9.00 on the following trading day based on the introduction of a Senate resolution by Senator George of Georgia in which it was stated that the Senate is opposed to loan cotton sales at less than cost to the Government. Passage of the Bankhead cotton bill, which consists of certain sections of the more inclusive Smith bill, also strengthened the market for a few days. Due to the uncertain European situation and easier stocks, the price has been declining in the past few days. High for the period was 9.15 on March 10; low was 8.73 on April 6. Quotations on the Exchange follow:

	Mar. 9 Close	April 10 High	April 10 Low	April 10 Close
July	8.13	7.80	7.74	7.80
October	7.69	7.50	7.48	7.50
December	....	7.47	7.42	7.45

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.27	@	—
Peeler, carded, 23/4/3	lb.	.28	@	—
Peeler, carded, 15/3/3	lb.	.25	@	—
Peeler, carded, 13/3/3	lb.	.24	@	—
Egyptian, carded, 23/5/3	lb.	.40	@	—
Egyptian, combed, 23/5/3	lb.	.45	@	—

CHAFERS

Carded, American, 1 1/16"	lb.	.27	@	.27¼
Carded, American, 1"	lb.	.17½	@	.22½

Sheetings

48x40	36 in.	5.50	lb.	—	@ .03½
40x40	36 in.	6.15	lb.	—	@ .03¼
40x36	36 in.	6.50	lb.	—	@ .03
48x48	40 in.	2.50	lb.	—	@ .06¾
48x48	40 in.	2.85	lb.	—	@ .06
56x60	40 in.	3.60	lb.	—	@ .05½
48x44	40 in.	3.75	lb.	—	@ .04⅝
44x40	40 in.	4.25	lb.	—	@ .04¼

Ducks

Enameling (single filling)	lb.	.21	@	.23
Belting and Hose	lb.	.25¼	@	—
Single filling, A grade	lb.	.09¼	@	.12¼
Double filling	lb.	.10¼	@	.13¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM MARCH 10TH TO APRIL 10TH

Date	Spot	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Sales
Mar. 10	16.65	16.65	16.68	16.71	16.69	16.66	16.66	16.66	16.64	16.64	16.66	16.66	16.66	——	89
11	16.66	16.67	16.69	16.71	16.68	16.66	16.66	16.66	16.63	16.64	16.66	16.66	16.66	——	27
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	16.48	16.45	16.49	16.53	16.52	16.49	16.49	16.50	16.51	16.49	16.49	16.49	16.49	——	145
14	16.45	16.43	16.48	16.52	16.49	16.46	16.47	16.48	16.48	16.47	16.46	16.46	16.46	——	49
15	16.25	16.24	16.27	16.31	16.29	16.28	16.28	16.28	16.28	16.28	16.29	16.29	16.29	——	192
16	16.25	16.24	16.25	16.26	16.25	16.25	16.25	16.25	16.25	16.25	16.24	16.24	16.24	——	244
17	16.12	16.09	16.12	16.15	16.14	16.13	16.14	16.16	16.16	16.16	16.14	16.14	16.14	——	154
18	15.80	15.77	15.80	15.84	15.82	15.80	15.80	15.80	15.80	15.80	15.80	15.80	15.80	——	247
19	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
20	15.80	15.77	15.80	15.83	15.83	15.80	15.81	15.82	15.82	15.82	15.81	15.84	15.84	——	190
21	15.90	15.90	15.91	15.92	15.93	15.93	15.94	15.95	15.95	15.95	15.94	15.94	15.94	——	215
22	15.80	15.83	15.83	15.84	15.84	15.84	15.86	15.87	15.87	15.87	15.86	15.87	15.87	——	215
23	16.12	16.06	16.08	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.11	16.11	——	117
24	16.10	16.11	16.12	16.14	16.14	16.15	16.14	16.14	16.14	16.14	16.15	16.15	16.15	——	99
25	16.06	16.01	16.01	16.01	16.03	16.04	16.04	16.05	16.05	16.05	16.05	16.05	16.05	——	24
26	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
27	16.13	16.14	16.13	16.12	16.12	16.12	16.12	16.13	16.13	16.13	16.13	16.13	16.13	——	131
28	16.06	16.06	16.06	16.05	16.05	16.05	16.05	16.05	16.05	16.05	16.05	16.05	16.05	——	71
29	16.08	——	16.08	16.05	16.05	16.06	16.04	16.01	16.05	16.05	16.06	16.06	16.06	——	45
30	15.90	——	15.90	15.86	15.86	15.87	15.87	15.87	15.87	15.87	15.87	15.87	15.87	——	124
31	15.80	——	15.82	15.78	15.79	15.79	15.79	15.79	15.78	15.79	15.79	15.81	15.81	——	198
Apr. 1	15.87	——	15.91	15.90	15.89	15.88	15.89	15.90	15.89	15.89	15.88	15.89	15.89	15.89	55
2	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
3	16.00	——	16.00	16.00	16.00	16.00	15.99	15.99	15.99	15.99	16.00	16.01	16.01	16.01	71
4	15.90	——	15.90	15.90	15.91	15.92	15.93	15.94	15.93	15.93	15.93	15.94	15.94	15.94	135
5	16.01	——	16.01	16.01	16.01	16.02	16.02	16.03	16.02	16.02	16.03	16.04	16.04	16.04	120
6	16.12	——	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.12	16.12	16.12	160
7	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
8	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
9	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
10	16.06	——	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	16.08	55

New York
April 12, 1939

Rubber CHEMICAL Markets

All Quotations F.O.B. Works Unless Noted

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.24	@	—
A-11	lb.	.52	@	.65
A-19	lb.	.52	@	.65
A-32	lb.	.70	@	.80
A-77	lb.	.42	@	.55
A-100	lb.	.42	@	.55
Aldehyde ammonia, crystals	lb.	.65	@	.70
Altax	lb.	.55	@	.70
Butyl Zimate	lb.	3.00	@	—
Captax	lb.	.50	@	.60
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.46
Diphenylguanidine	lb.	.35	@	.45
El-Sixty	lb.	.50	@	.65
Ethyl Zimate	lb.	3.00	@	—
Ethylidene aniline	lb.	.42	@	.43
Formaldehyde aniline	lb.	.37½	@	.42
Guantal	lb.	.40	@	.50
Heptene	lb.	.35	@	.40
Hexamethylenetetramine	lb.	.36	@	—
Lead Oleate, No. 999	lb.	.14	@	—
Witco		.15	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	—	@	2.65
Oxynone	lb.	.64	@	.80
Phenex	lb.	.50	@	.55
Pip-Pip	lb.	2.50	@	—
Pipsolene	lb.	1.55	@	1.85
R & H 40	lb.	.40	@	.41
R & H 50-D	lb.	.42	@	.43
R-2	lb.	1.40	@	1.80
R-2 Crystals	lb.	2.50	@	2.75
R 43	lb.	.40	@	—
RN-2	lb.	1.40	@	1.80
RN-2 Crystals	lb.	2.00	@	2.25
Rotax	lb.	.60	@	.65
Safex	lb.	1.25	@	1.30
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.	.50	@	—
No. 2	lb.	.18	@	.20
Thiocarbanilid, drums	lb.	.24	@	.30
Trimene	lb.	.55	@	.65
base	lb.	1.05	@	1.20
Triphenylguanidine	lb.	.45	@	—
Tuads	lb.	2.65	@	—
Ureka	lb.	.60	@	.75
Ureka Blend B	lb.	.60	@	.75
Ureka C	lb.	.56	@	.65
Vulcanex	lb.	.42	@	.43
Vulcone	lb.			
Vulcanol	lb.	.85	@	—
Zimate	lb.	2.65	@	—
Inorganic				
Litharge, domestic	lb.	.07	@	.07½
Magnesia, calcined, heavy	lb.	.04	@	—

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.36	@	.37
Ultramarine	lb.	.15	@	—
Browns				
Mapico	lb.	.13	@	—
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome	lb.	.21	@	—
Chromium Oxide, bbl.	lb.	.21	@	—
Guignet's Green	lb.	.°0	@	—
Reds				
Antimony crimson, 15/17	lb.	.45	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone, No. 19	lb.	.05½	@	.06½
Cryptone CB, No. 21	lb.	.05½	@	.06½
Cryptone, ZS-20	lb.	.08½	@	.08½
Cryptone, ZS-86	lb.	.08½	@	.08½
Lithopone				
Albalith, black label—11	lb.	.04½	@	.04½
Azolith	lb.	.04½	@	.04½
Ray-bar	lb.	.05⅞	@	.06½
Ray-cal	lb.	.05⅞	@	.06½
Rayox	lb.	.16	@	.19
Titanox A	lb.	.14	@	.17
Titanox B	lb.	.05½	@	.06½
Titanox C	lb.	.05½	@	.06½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06¼	@	.06½
Anaconda, lead free	lb.	.06¼	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06¼	@	.06½
XX Red—4	lb.	.06¼	@	.06½
XX Red—72	lb.	.06¼	@	.06½
XX Red—78	lb.	.06¼	@	.06½
XX Red—103	lb.	.06¼	@	.06½
Kadox, black label—15	lb.	.06½	@	.06¾
Blue label—16	lb.	.06½	@	.06¾
Red label—17	lb.	.06½	@	.06¾
St. Joe, black label	lb.	.06¼	@	.06½
green label	lb.	.06¼	@	.06½
red label	lb.	.06¼	@	.06½
U. S. P—7, bbls.	lb.	.09½	@	.09¾
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	.08½	@	.08¾
Green seal—8	lb.	.08	@	.08¼
Red seal—9	lb.	.07½	@	.07¾
Yellows				
Cadmolith	lb.	.45	@	.50
Chrome	lb.	.14½	@	.15½
Mapico	lb.	.09½	@	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0275	@	.0625
Bone, powdered	lb.	.05½	@	.14
Carbon, compressed	lb.	.0275	@	.0625
uncompressed	lb.	.0275	@	.0625
"Certified"	lb.	—	@	—
"Spherons"	lb.	—	@	—
"Disperso"	lb.	.0275	@	.0625
"Excello," compressed	lb.	.0275	@	.0625
"Fumonex"	lb.	.03	@	.05
"Gastex"	lb.	.03	@	.05
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.0275	@	.0625
"Supreme"	lb.	.0275	@	.0625
Thermatomic—"P 33"	lb.	.04¾	@	.07¾
"Thermax"	lb.	.01¾	@	.05
United "Dixie" & "Kosmos"	lb.	.0275	@	.0625

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	13.00	@	15.00
Barium carbonate (98-100%)	ton	—	@	—
Barium Dust	lb.	.05	@	.06
Barytes	ton	23.65	@	31.15
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	60.00	@	65.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	9.50	@	21.00
Congaree	ton	9.50	@	—
Crown (f.o.b. plant)	ton	9.50	@	—
Dixie	ton	11.00	@	30.00
Dixie, Jr.	ton	9.50	@	29.00
McNamee	ton	9.50	@	22.00
Par	ton	9.50	@	22.00
Witco	ton	9.50	@	—
Cotton Flock (Dark)	lb.	.10	@	.13
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	19
Kalite No. 1	ton	24.00	@	50.00
Kalite No. 3	ton	34.00	@	60.00
"Lime Crest" Industrial Filler No. 100	lb.	—	@	—
Magnesium carbonate	lb.	.07½	@	—
Mica	ton	35.00	@	44.00
Pyrax A	ton	7.50	@	20.00
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	2.90	@	4.10
Talc, domestic	ton	17.00	@	20.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Witco	ton	6.00	@	—
Wood Flour	ton	20.00	@	25.00
Zinc Carbonate	lb.	—	@	.10¾
Zinc Stearate	lb.	.23	@	—

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00	@	42.00
Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton	22.00	@	42.00
Parmr, solid	ton	25.00	@	—
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

MISCELLANEOUS

Aromatics—Rodo $0	lb.	3.50	@	4.00
Rodo $10	lb.	4.50	@	5.00
Curodex 19	lb.	2.75	@	—
Curodex 188	lb.	3.50	@	—
Curodex 198	lb.	4.50	@	—
Para-Dora No. 5145	lb.	2.00	@	—
Areaklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35	@	.50
Darvan (dispersing agent)	lb.	.30	@	.50
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.11	@	—
Sunproof	lb.	.23	@	.25
Sponge Paste	lb.	—	@	.80
Tackol (tackifier)	lb.	.115	@	—
Tonox	lb.	.52	@	.61

SOFTENERS

Acids				
Acetic, 28%, bbls.	100 lb.	2.53	@	2.78
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.12	@	.14
Stearex Beads	lb.	.08	@	.09
Stearic, double pressed	lb.	.12½	@	.13½
Stearite	lb.	.10½	@	.11¾
Alkalies				
Caustic Soda, 76%	cwt.	2.70	@	3.55
Soda Ash, 58%, C.L.	cwt.	—	@	2.35
Oils				
Cycline Oil	gal.	.14	@	.20
Degras, bbls.	lb.	.07¾	@	.08
Fluxrite	lb.	.05½	@	.06½
Palm Niger	lb.	.05½	@	.06½
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.03½	@	.03¾
Pigmentaröil, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
Pine, steam distilled	gal.	.64	@	.69
dest. dist., drums	gal.	.49	@	.50
Rosin Oil, cmpd	gal.	.40	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rubtack	lb.	.08	@	.10
Seedine, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.07	@	—
Witco Softener No. 20	gal.	.20	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05½	@	.06¼
coal tar	ton	19.00	@	22.00
hardwood	ton	16.00	@	22.50
pine, 200 lb. gr. wt.	bbl.	6.00	@	6.50
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	ton	20.00	@	26.00
Solvents				
Acetone, pure	lb.	—	@	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33	@	.39
Benzene, 90%	gal.	.18	@	.23
Beta-Trichlorethane	gal.	—	@	.20
Bondogen	lb.	.98	@	1.50
Carbon, bisulfide	lb.	.05¼	@	.08
Carbon tetrachloride	lb.	.05½	@	.08
Dichlorethylene	lb.	—	@	.25
Dipentene, cml., drums	gal	.41	@	.50
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05½	@	.06¼
Plastogen	lb.	.07¾	@	.12½
Reogen (drums)	lb.	.11½	@	.20
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.43	@	.47
dest. dist., drums	gal.	.33	@	.41
Waxes				
Beeswax, white	lb.	.39	@	.45
Carnauba, yellow	lb.	.46	@	.47½
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10¾	@	.11¾
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02¾	@	—
White crude scale 124/126	lb.	.02¾	@	.03
Refined, 122/127	lb.	.04½	@	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50	@	2.10
Exel	lb.	1.00	@	1.40
Gel	lb.	.57	@	.77
Hipar	lb.	.65	@	.92
Powder	lb.	.52	@	.73
Resin	lb.	.52	@	.73
Resin D	lb.	.52	@	.73
White	lb.	1.25	@	1.75
Albasan	lb.	.70	@	.75
Antox	lb.	.56	@	.58
B-L-E	lb.	.52	@	.61
Flectol B	lb.	.52	@	.65
Flectol H	lb.	.52	@	.65
Flectol White	lb.	.90	@	1.15
Neozone	lb.	.52	@	.63
Oxynone	lb.	.68	@	—
Retardex	lb.	.35	@	.40
Santoflex B	lb.	.52	@	.65
Santovar A	lb.	1.15	@	1.40
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.52	@	.61

MOLD LUBRICANTS

Aresklene	lb.	—	@	—
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Lubrex	lb.	.2[illegible]	@	.30
Mold Paste	lb.	.12	@	.18
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rusco, f.o.b. Nitro	lb.	.12	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.19	@	—
Black	lb.	.07	@	.11
White	lb.	.08	@	.12
Brown	lb.	.07	@	.11
Neophax	lb.	.10¼	@	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½	@	.15
Sulfur Chloride, yellow (drs.)	lb.	.04	@	—
Sulfur flour, Refined, 100% pure (bags)	cwt.	2.50	@	3.65
Commercial (bags)	cwt.	1.60	@	2.35
Telloy	lb.	1.75	@	—
Vandex	lb.	1.75	@	—

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1938:							
Feb.	39,380	13,095,429	14.85	305	109,756	16.08	39,075
Mar.	41,592	13,494,654	14.48	646	198,865	13.74	40,946
Apr.	31,042	9,495,476	13.66	250	75,797	13.55	30,792
May	27,229	8,010,250	13.13	528	167,831	14.20	26,701
June	25,983	7,150,115	12.29	399	116,458	13.03	25,584
July	21,771	5,723,381	11.74	420	127,522	13.54	21,351
Aug.	30,798	8,477,231	12.29	432	133,350	13.79	30,366
Sept.	34,383	10,650,107	13.83	803	242,324	13.48	33,580
Oct.	33,449	10,945,896	14.61	621	196,523	14.14	32,828
Nov.	31,903	10,572,345	14.79	415	146,276	15.73	31,488
Dec.	36,031	12,601,926	15.61	424	141,364	14.87	35,607
1939							
Jan.	35,255	12,313,006	15.59	468	165,663	15.79	34,787
Feb.	29,109	10,269,224	15.75	460	152,113	14.76	28,649

* Revised.

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1938:								
Feb.	218	60,097	33	11,393	892	355,080	1,684	560,883
Mar.	150	41,518	69	19,454	587	239,271	979	327,844
Apr.	188	50,423	66	25,741	1,265	444,756	889	295,690
May	229	61,756	29	8,806	900	274,652	879	279,502
June	150	41,518	34	11,496	918	276,126	695	214,420
July	223	49,099	51	16,130	869	267,491	634	209,526
Aug.	250	53,285	41	13,637	526	159,784	876	308,573
Sept.	173	37,954	39	13,896	740	225,161	683	235,242
Oct.	126	27,692	45	20,641	614	163,635	876	347,348
Nov.	59	12,923	66	24,725	307	76,452	1,020	394,082
Dec.	181	39,869	13	6,263	917	237,653	1,263	479,966
1939:								
Jan.	226	49,580	61	20,417	843	203,753	1,602	599,927
Feb.	212	46,576	15	4,426	510	129,726	1,717	657,565

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

	Figures on Monthly Basis: 1932*	1933*	1934*	1935*	1936*	1937*	1938	1939
Jan.	29,648	22,645	39,190	46,636	48,631	50,879	29,429	46,234
Feb.	31,821	21,392	40,515	42,720	36,841	51,950	23,868	42,365
Mar.	29,505	17,843	47,003	42,153	42,813	54,129	30,487	
Apr.	27,518	25,928	44,853	44,247	52,031	51,859	27,984	
May	30,957	44,074	42,918	41,101	50,612	51,795	28,947	
June	41,475	50,743	40,147	36,156	52,772	51,860	30,629	
July	29,976	49,614	32,553	35,917	48,250	43,703	32,209	
Aug.	23,721	44,428	33,216	38,775	46,777	41,506	38,170	
Sept.	23,847	35,281	30,258	37,086	46,449	43,945	37,823	
Oct.	22,286	31,543	31,253	41,969	49,637	38,754	40,333	
Nov.	23,231	28,831	34,748	42,310	50,433	34,025	46,169*	
Dec.	18,015	28,757	36,569	42,474	49,754	29,195	45,315	
Tot.	332,000	401,079	453,223	491,544	575,000	543,600	411,363	

* Revised.

Note: Figures for 1931-1937 were revised in May, 1938, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078	23.0	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486	24.6	19,000
1932	75,608	77,504	23.4	16,354	1937*	185,033	162,000	29.8	28,800
1933	99,560	81,602	19.9	20,746	1938	113,482	113,341	27.6	21,769

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1938:									
Jan.*	7,698	6,940	23.6	28,900	July	7,109	8,273	25.7	18,832
Feb.*	6,198	7,141	29.9	27,487	Aug.	10,472	10,732	28.1	17,892
Mar.*	6,875	8,471	27.8	25,432	Sept.	12,016	11,281	29.8	18,127
Apr.	6,399	7,480	26.7	23,339	Oct.	13,558	11,803	29.3	19,090
May	6,866	8,009	27.7	22,275	Nov.	13,995	12,668	27.5	19,823
June	7,584	8,274	27.0	21,040	Dec.	14,712	12,269	27.1	21,769
1939:									
Jan.	13,763	13,000	28.1	21,960	July	.....	.....	...	.....
Feb.	13,093	12,626	29.8	21,390	Aug.	.....	.....	...	.....
Mar.	.....	.....	...	.....	Sept.	.....	.....	...	.....
Apr.	.....	.....	...	.....	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1937*	1938	1939		1937*	1938	1939
January	33,668	35,176	37,847	August	49,598	50,459	.....
February	32,034	31,861	34,595	September	47,515	46,058	.....
March	40,524	41,259	.....	October	45,446	46,272	.....
April	43,461	43,254	.....	November	42,718	44,991	.....
May	45,407	44,911	.....	December	39,465	41,649	.....
June	48,447	48,293	.....				
July	51,069	47,474	.....	Total	519,352	521,657	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,192
1929	24,141,502	1933	8,713,962	1937	22,257,964
1930	17,364,096	1934	12,255,118	1938	10,612,138

1939		1939		1939	
January ...	1,714,137	May	.....	September .	.....
February ..	1,442,535	June	.....	October ...	.....
March	.....	July	.....	November .	.....
April	.....	August	.....	December .	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market. in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1936																																
Nov.		17⅝		17⅝	17⅞	17⅞	17⅞		17⅝	17⅝		17⅝	17¾	17¾		18⅛	18¾	18¾	18¾	18¾	18⅞		18⅜	18⅜	18⅜		18⅞		18½		
Dec.	18⅛	18⅛	18⅛	19	19⅛	19⅛	19⅛	19⅛	19⅛	19¼	19	19		19¼	19⅛	20⅛	20⅛	20⅛	20⅛		20¼	20⅛	20⅛	20⅛	21¼		23	22⅜	21¼	21⅛		18
1937																																20
Jan.				20⅜	20⅜	21⅛	21⅛	21⅛	22⅛	22⅛	22⅜	22⅛	22	21⅛		21⅞	21⅞	21⅞	20⅛	20⅛	20⅛	20⅛	20⅛	20⅜	21¾	21⅝	21⅝	21⅛	21⅛	21⅛			21¾
Feb.	21	21⅜	21⅛	21¾	21¾	21⅞		21½	21¾	21½	21⅞	23⅛	23⅜	24⅛	22⅞	21⅞	24⅛	24⅛	25⅛	24⅜	24⅜	24⅜	24⅜	25⅛	25⅛	21⅞	21⅞	21⅞	21⅞	21⅞		21½
Mar.	21⅛			21⅛	22½	22⅛	22⅛	22⅜	22⅜	23⅜	23⅛	23⅛	23⅜	22⅞	22⅞	22⅞	24⅛	24⅛	24⅛	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞		24⅛
April	26⅛	26⅜	26⅛			24⅛	24⅛	24⅜	24⅜	24⅛																						23⅜
May	21		21	21⅛	21½	21⅛		23½	23½	21½	21⅜	21½	20⅞	20⅞	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	21⅛	19⅜	19⅜	19⅜	20⅜	20⅜	20⅜	20⅜	20⅜	20⅜		21¼
June	20⅛	20⅛	19⅞	19⅛	19⅛	19⅛	19⅛	19⅛	18½	18⅛	18⅞	18⅞	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛		19¼
July	19⅜	19⅜	18⅞	18½	18½	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛		18⅛
Aug.	18⅛	18⅛	18⅛	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞		17⅞
Sept.	18⅛	18⅛	18⅛	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞		17⅞
Oct.	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞		17⅞
Nov.	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞	17⅞		17⅞
Dec.	15⅞																															
1938																																
Jan.		14½		14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜		14⅜
Feb.		14⅞	14⅞	14⅜	14⅜	14⅜		14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜		14⅜
Mar.		14⅞	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜		14⅜
April		11⅜		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜		11⅜
May		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜		11⅜
June		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜		11⅜
July		15¼		15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛		15⅛
August		15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛		15⅛
Sept.		16⅛		16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛		16⅛
Oct.		16⅛		16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛		16⅛
Nov.		16⅜	16⅜	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛		16⅛
Dec.		15⅝		15½	15½																											
1939																																
Jan.		15⅝		16⅛		16																										
Feb.		15⅜	16⅛	15⅛																												
March		16⅛	16⅛	16⅛		16																										
April		15⅞		15⅛																												

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1911-1931

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17

Average Monthly Price per Pound Since 1932

	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	4.38	3.08	9.32	13.10	14.35	21.37	14.63	15.75
Feb.	4.03	2.95	10.45	12.92	15.48	21.33	14.71	15.93
Mar.	3.35	3.01	11.01	11.51	15.89	24.09	13.55	16.26
Apr.	3.02	3.56	12.10	11.55	15.98	23.44	11.84	
May	3.09	4.95	13.26	12.05	15.62	21.14	11.57	
June	2.66	6.15	13.51	12.57	15.85	19.29	12.57	
July	2.89	8.01	14.60	12.10	16.49	18.86	15.37	
Aug.	3.63	7.31	15.47	11.98	16.25	18.37	16.08	
Sept.	3.84	7.30	15.36	11.55	16.46	18.55	16.15	
Oct.	3.65	7.64	13.96	12.62	16.55	16.28	16.89	
Nov.	3.44	8.66	13.04	13.15	17.97	14.60	16.24	
Dec.	3.24	8.87	12.98	13.28	20.01	15.41	16.05	
Average for Year	3.49	5.96	12.92	12.37	16.41	19.39	14.64	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1939 Jan.	1939 Feb.	1939 Mar.	1939 Apr.	Day	1939 Jan.	1939 Feb.	1939 Mar.	1939 Apr.
1		7 11/16	8¼	7 11/16	17	7 7/8	8 1/16	8 1/16	
2		7¾	8 3/16		18	7 11/16	8 1/16	7 7/8	
3	8 3/16	7 11/16	8¼	8	19	8			
4	8 1/16	7 11/16	8 1/16	7¾	20	7 11/16	8 1/16	7 11/16	
5	8 1/16			7 11/16	21	7 11/16	8 1/16	7 11/16	
6	8 1/16	7 7/8	8 1/16	7 11/16	22		8 1/16	7 7/8	
7	8 1/16	7 11/16	8 3/16		23	7 11/16	8 1/16	8	
8		7 11/16	8 1/16		24	7 11/16	8 1/16	8	
9	8 1/16	7 11/16	8 1/16		25	7¾	8 1/16	7 11/16	
10	8 1/16	7 7/8	8 1/16		26	7½			
11	8 1/16	7 11/16	8 1/16		27	7 7/8	8¼	8 1/16	
12	8				28	7 7/8	8¼	7 11/16	
13	7 11/16	7¾	8¼		29			8	
14	7 11/16	7 11/16	8 1/16		30	7 11/16		8	
15		8	8 1/16		31	7 7/8		8	
16	8	7 11/16	8 1/16						

Average Monthly Price Per Pound

Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence	Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence
Jan.	6.758	10.378	7.077	7.926	Aug.	7.581	8.830	7.841	
Feb.	7.255	10.503	7.029	7.942	Sept.	7.577	8.935	7.918	
Mar.	7.450	11.766	6.590	8.120	Oct.	7.898	7.855	8.355	
Apr.	7.502	11.471	5.793		Nov.	8.572	7.080	8.111	
May	7.335	10.250	5.632		Dec.	9.580	7.332	8.005	
June	7.352	9.548	6.147		Average for Year	7.713	9.424	7.164	
July	7.696	9.136	7.464						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1939 Feb.	1939 Mar.	1939 Apr.	Date	1939 Feb.	1939 Mar.	1939 Apr.	Date	1939 Feb.	1939 Mar.	1939 Apr.
1	8.99	9.05	8.81	11	8.95	9.11		22		8.92	
2	8.99	9.05		12				23	8.90	8.94	
3	9.04	9.08	8.87	13		9.14		24	8.90	8.90	
4	9.06	9.12	8.75	14	9.01	9.09		25	8.98	8.92	
5			8.79	15	8.99	9.08		26			
6	9.05	9.17	8.73	16	8.94	8.98		27	9.03	8.92	
7	9.01	9.13		17	8.94	9.02		28	9.07	8.90	
8	8.99	9.02		18	8.92	8.89		29		8.83	
9	8.95	9.10		19				30		8.80	
10	9.00	9.15	8.74	20	8.91	9.00		31		8.83	
				21	8.89	8.96					

Average Monthly Price Per Pound

Month	1936 Cents	1937 Cents	1938 Cents	1939 Cents	Month	1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	11.91	13.06	8.57	8.94	Aug.	12.28	10.41	8.41	
Feb.	11.53	13.15	8.91	8.97	Sept.	12.31	9.02	8.17	
Mar.	11.43	14.46	8.92	9.00	Oct.	12.30	8.42	8.61	
Apr.	11.71	14.23	8.76		Nov.	12.23	7.96	9.08	
May	11.68	13.34	8.50		Dec.	12.83	8.26	8.72	
June	12.02	12.70	8.38		Average for Year	12.11	11.44	8.66	
July	13.11	12.26	8.85						

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1937	ON HAND 1938	ON HAND 1939	AFLOAT 1937	AFLOAT 1938	AFLOAT 1939	ON HAND AND AFLOAT 1937	ON HAND AND AFLOAT 1938	ON HAND AND AFLOAT 1939
Jan.	204,436	274,581	237,826	55,096	57,356	48,210	259,532	331,937	286,036
Feb.	195,692	294,338	231,475	53,538	47,459	55,814	249,230	341,797	287,289
Mar.	192,980	299,172		56,994	41,882		249,974	341,054	
Apr.	176,289	301,436		72,530	39,071		248,819	340,507	
May	175,273	299,720		58,542	32,859		233,815	332,579	
June	172,056	294,566		57,215	32,079		229,271	326,645	
July	167,094	284,914		75,779	40,400		242,873	325,314	
Aug.	174,195	277,463		80,439	47,772		254,634	325,235	
Sept.	186,193	276,586		83,288	48,927		269,481	325,513	
Oct.	200,025	269,937		80,653	51,062		280,678	320,999	
Nov.	222,707	254,196*		81,302	51,114		304,009	305,310*	
Dec.	262,204	245,413		63,099	45,105		325,303	290,518	

* Revised.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1937	London 1938	London 1939	Liverpool 1937	Liverpool 1938	Liverpool 1939
January	29,005	40,203	51,420	41,895	21,711	28,789
February	26,508	46,596	48,312	37,078	24,737	26,784
March	21,292	50,233		30,622	26,220	
April	21,128	54,296		27,443	28,277	
May	21,351	57,194		25,081	29,862	
June	21,964	60,307		21,258	31,837	
July	22,589	62,236		19,424	32,825	
August	25,211	65,113		19,817	34,315	
September	28,462	63,321		21,190	34,645	
October	30,465	59,609		21,327	33,483	
November	33,304	57,794		21,399	32,116	
December	35,633	55,668		21,978	31,012	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [3]	Holland	Para and Manaos
At end of 1938					
January	48,494*	49,643	5,976	131	2,024
February	46,241	47,990	5,653	169	2,342
March	50,797	48,473	5,490	180	1,212
April	40,614	45,008	4,812	155	1,083
May	40,598	45,426	4,876	169	816
June	44,729	49,290	4,488	190	904*
July	45,529	52,081	5,014	711	944
August	41,002	49,922	4,659	672	1,032
September	35,386	53,815	5,339	662	1,599
October	34,901	54,720	4,916	669	1,796*
November	31,255	54,283	4,409	349	2,267
December	27,084	57,800	6,120	268	1,864
At end of 1939					
January	30,975	59,155	4,827	198	1,557

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
End of: 1938				
February	47,459	44,200	16,341	108,000
March	41,882	44,700	22,418	109,000
April	39,071	42,960	31,969	114,000
May	32,859	40,600	20,541	94,000
June	32,079	42,580	17,341	92,000
July	40,400	39,150	25,450	105,000
August	47,772	34,500	18,728	101,000
September	48,927	29,200	17,873	96,000
October	51,062	26,100	21,838	99,000
November	51,114	26,700	14,186	92,000
December	45,105	26,800	18,095	80,000
End of: 1939				
January	48,210	30,000	26,790	105,000
February	55,814	30,000	20,186	106,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P— Preliminary estimate.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1934	1935	1936*	1937	1938	1939
January	661,948	698,153	600,479	454,249*	551,632*	523,345
February	663,308	686,195	599,355	445,265*	569,242*	505,258
March	666,382	678,809	583,318	447,856*	591,968	.....
April	658,796	677,006	567,172	428,249*	593,340	.....
May	689,239	677,569	541,871	413,134*	577,063*	.....
June	672,804	671,525	520,255	434,270*	583,952	.....
July	676,200	679,061	519,074	445,782	593,481	.....
August	674,702	680,644	500,520	457,462*	580,489*	.....
September	694,361	661,509	493,585	470,768*	568,902*	.....
October	680,616	655,000	486,159	479,398*	560,948	.....
November	684,408	617,300*	466,491	493,266*	535,048*	.....
December	705,975	613,987*	466,576	545,533*	508,532	.....
Monthly Avge..	677,395	666,397*	528,738	460,022*	567,893	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Quarter	Production Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	12,323	11,004	6,635	13,437	13,355	11,376	15,565	7,532
Apr.-June	16,295	12,980	14,412	13,565	12,597	14,892	15,834	8,358
July-Sept.	12,004	9,245	14,707	9,822	11,312	14,914	12,207	11,240
Oct.-Dec.	8,117	6,856	9,550	10,406	12,099	14,858	9,704	13,052
Total	48,739	40,085	45,304	47,230	49,363	56,040	53,310	40,182

Quarter	Shipment Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	11,268	8,760	6,981	10,730	11,154	10,554	14,143	7,534
Apr.-June	15,919	18,021	15,139	14,998	13,473	15,940	15,741	10,363
July-Sept.	14,354	8,141	13,707	11,648	13,489	14,037	13,106	11,748
Oct.-Dec.	8,510	5,329	8,265	9,310	12,066	12,855	10,495	12,685
Total	50,051	40,251	44,092	46,686	50,182	53,386	53,485	42,330

Quarter	Inventory Figures [2] 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	10,014	9,878	7,290	11,651	11,675	8,762	12,004	10,521
Apr.-June	10,447	4,999	6,615	10,219	10,755	7,556	12,081	8,470
July-Sept.	8,158	6,096	7,595	8,419	8,288	8,690	11,200	8,022
Oct.-Dec.	7,775	7,644	8,888	9,455	8,196	10,717	10,383	8,451

Figures for Recent Months

	PRODUCTION 1937	1938	1939	SHIPMENTS 1937	1938	1939	INVENTORY [2] 1937	1938	1939
Jan.	4,802	2,697	4,581	4,348	2,448	4,163	10,971	10,801	8,932
Feb.	5,059	2,156	4,344	4,215	2,291	3,739	11,868	10,559	9,573
Mar.	5,704	2,680	....	5,580	2,795	....	12,004	10,521	....

AUTOMOBILE INNER TUBES

Quarter	Production Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	11,989	10,721	6,230	12,823	12,553	11,891	15,831	7,314
Apr.-June	15,388	11,913	13,001	13,191	11,631	14,624	15,413	7,380
July-Sept.	12,839	8,286	14,356	10,321	11,270	15,320	12,038	10,794
Oct.-Dec.	8,117	5,970	9,000	9,891	12,425	15,201	9,092	12,360
Total	48,333	36,890	42,587	46,226	47,879	57,036	52,374	37,848

Quarter	Shipment Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	11,251	8,918	6,539	10,640	11,252	11,367	14,606	7,387
Apr.-June	15,314	16,271	13,292	14,553	11,928	15,113	15,495	9,564
July-Sept.	15,282	7,761	13,370	11,545	13,251	15,069	12,901	11,243
Oct.-Dec.	8,174	4,961	8,189	8,306	11,636	12,874	9,765	12,099
Total	50,021	37,911	41,390	45,044	48,067	54,423	52,767	40,239

Quarter	Inventory Figures [2] 1931	1932	1933	1934	1935	1936*	1937*	1938*
Jan.-Mar.	10,475	9,448	6,369	10,244	10,406	8,660	11,993	10,547
Apr.-June	10,504	5,174	6,097	8,795	10,050	8,075	11,833	8,337
July-Sept.	8,095	5,753	7,008	7,639	7,565	8,595	11,326	7,859
Oct.-Dec.	7,922	6,749	7,815	9,180	8,231	10,945	10,312	8,166

Figures for Recent Months

	PRODUCTION 1937	1938	1939	SHIPMENTS 1937	1938	1939	INVENTORY [2] 1937	1938	1939
Jan.	4,837	2,516	4,098	4,424	2,527	3,936	11,183	10,582	8,069
Feb.	5,128	2,216	3,681	4,570	2,216	3,335	11,821	10,579	8,415
Mar.	5,866	2,582	....	5,612	2,645	....	11,993	10,546	....

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.
* Revised.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,124
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937*	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,635	2,000,985	488,650	166,142	125,081	41,061	2,655,777
1938*							
July	141,443	106,841	34,602	9,007	5,273	3,734	150,450
Aug.	90,494	58,624	31,870	6,452	3,063	3,389	96,946
Sept.	83,534	65,159	18,375	6,089	4,290	1,799	89,623
Oct.	209,512	187,494	22,018	5,774	5,412	362	215,286
Nov.	372,413	320,344	52,069	17,992	15,423	2,569	390,405
Dec.	388,346	326,006	62,340	18,670	15,518	3,152	407,016
1939							
Jan.	339,152	280,040	59,112	14,794	11,404	3,390	354,946
Feb.	297,841	239,983	57,858	14,300	10,914	3,386	312,141
Mar.	.....	.....	.....	.....	.....	.....	.....

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								NETHERLAND INDIES [4]						
	Gross Exports	Imports	Net Exports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Siam [3]	Java & Madura	Sumatra E. Coast	Other N. I.	Indo-China [3]	Amazon Valley	All Other [5]	World Total [6]
1923	252,016	70,432	181,584	39,971	6,416	3,705	4,237	1,718	32.930	46,344	57,822	5,067	16,765	7,856	406.415
1924	259.706	108.524	151,182	39.997	7,697	6,699	4,621	2.962	42.44e	34.497	80.347	6,688	23.165	9.0e5	429.36e
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5.377	46.757	05.499	120.626	7,881	25.298	13.797	514.487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4.027	52.186	71,413	121,231	8,203	24.298	16.017	e21.530
1927	371,322	182.845	188.477	53.35e	11.321	10.925	e.58e	5,472	55.297	77,815	142,171	8,645	28,782	15.e33	e06.474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58.848	82,511	121,770	9,548	21.129	10.e90	e53.794
1929	574.836	163.092	411.744	81.584	11.e03	11.077	7.381	5,018	65.990	87,789	134.037	9,696	21.148	e.767	853.894
1930	547,043	133.876	413,167	76.970	10.782	10.309	6.781	4,251	69,755	79,396	115,254	7,665	14.260	5.e51	814.241
1931	519,740	125.506	394.234	61.769	8.470	10.451	e.247	4,218	75,952	87,747	116,009	11,696	12.121	3.29e	792,203
1932	478.252	92.539	385.713	48.973	3.888	6.960	4.664	3,451	61,312	79.837	85,871	13,883	6.450	1.816	702.818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9.883	2.737	846.312
1934	677.361	211.803	465.558	79,746	10.492	17.233	11,103	17.545	87.400	112.058	175.470	20,170	8.903	2.985	1,008.663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8.885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864.574
1936	520,286	167,799	352.487	49 692	14,724	21,243	8.177	33,702	61,307	84.577	152.205	40.782	14,193	11,466	845.431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1937:															
Dec.	56,791	13,949	42,842	9,529	2,708	3,009	1,172	2,957	9,108	12,272	11,731	5,384	2,011	1,032	103,755
1938:															
Jan.	47,986	17,078	30,908	5,222	1,379	3,485	1,307	2,897	4,476	9,283	12,708	6,088	878	1,538	80,169
Feb.	48,899	11,874	37,025	5,216	1,409	8	918	3,266	6,391	8,777	12,154	3,070	1,542	1,032	80,808
Mar.	49,197	15,813	33,384	3,834	1,235	1,564	853	2,837	5,673	10,156	15,447	3,213	1,831	1,322	81,349
Apr.	53,864	9,158	44,706	1,951	1,327	1,728	1,158	1,583	5,967	10,081	12,434	3,647	1,004	774	86,360
May	38,245	10,325	27,920	2,833	1,470	1,648	815	2,507	4,575	7,515	9,944	3,118	1,053	904	64,302
June	42,258	14,394	27,864	3,693	1,318	2,441	643	3,904	4,519	7,788	12,120	4,776	718	818	70,602
July	43,689	18,713	24,976	3,861	1,083	2,057	937	4,710	6,808	8,271	19,955	5,139	625	1,063	79,485
Aug.	47,246	13,735	33,511	4,401	953	965	728	4,793	4,757	7,339	11,006	3,840	1,050	1,074	74,417
Sept.	40,992	10,586	30,406	3,990	1,036	756	284	3,893	4,026	7,052	9,092	8,139	758	1,292	70,724
Oct.	42,294	16,599	25,695	4,893	1,111	1,612	1,075	4,438	4,486	8,229	17,166	3,638	1,796	1,092	75,231
Nov.	39,340	10,219	29,121	6,422	1,271	929	567	3,223	3,975	5,678	9,568	4,035	1,159	990	66.938
Dec.	32,901	7,607	25,294	3,212	1,586	599	227	3,029	1,873	4,332	4,315	9,815	2,205	1,021	57.508
1939:															
Jan.	43,332	19,049	24,283	7,237	1,887	2,342	1,604	2,918	6,787	11,261	20,497	4,739	1,812	1,200*	86,567
Feb.	43,084	13,889	29,195	5,575	1,572	1,484	664	5,599	4,833	8,410	11,658	5,657	1,112	1,200*	76,959
Mar.	43,259	14,035	29,224	3,642	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,683	5,58'	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,896	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	14,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1937:															
Nov.	54,135	12,878	4,311	8,848	4,787	1,368	2,857	3,725	1,935	925	313	970	200*	846	98,098
Dec.	69,660	10,655	5,736	9,580	2,619	1,995	1,976	1,607	767	1,286	318	1,008	200*	1,890	109,297
1938:															
Jan.	45,596	15,458	4,769	6,314	1,789	4,933	1,809	693	574	1,257	300	1,239	200*	1,102	86,033
Feb.	40,977	16,505	5,456	6,959	615	3,172	2,000	2,341	578	974	534	1,114	200*	1,771	83,196
Mar.	42,075	15,911	4,845	10,768	2,123	6,220	1,365	2,162	1,043	961	342	1,088	200*	1,324	90,427
Apr.	31,870	14,653	5,757	6,497	999	5,454	2,397	4,281	640	904	449	971	200*	920	75,992
May	27,809	14,675	5,169	9,595	2,545	3,327	2,422	4,163	1,041	1,137	419	1,283	200*	957	74,742
June	26,429	14,053	4,542	7,478	3,243	2,145	2,399	505	805	853	663	1,149	200*	988	65,452
July	22,209	12,678	5,433	6,927	2,685	3,099	3,641	541	1,215	1,106	528	1,151	200*	635	62,048
Aug.	31,494	12,891	3,662	7,190	1,832	2,033	2,078	739	1,182	1,238	259	965	200*	595	66,358
Sept.	34,436	8,100	5,094	7,390	1,405	3,584	1,799	1,725	1,779	519	385	1,830	200*	608	68,854
Oct.	33,830	3,085	3,791	6,326	3,139	3,204	3,921	2,000*	1,780	848	420	3,022	200*	9	65,575
Nov.	32,567	936	5,322	7,275	3,123	4,665	1,984	4,000*	660	636	530	1,209	200*	379	63,486
Dec.	37,051	4,134	5,820	7,481	2,198	4,000	2,355	2,500*	647	876	263	1,013	200*	648	69,186
1939:															
Jan.	36,614	814	4,700	7,227	2,867	2,553	2,133	4,000*	910	898	454	1,037	200*	1,131	65,538
Feb.	30,578	4,940	.....	7,569	.....	.....	.....	.....	....	....	184	....	.....	.....	.....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.